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**MX SITING INVESTIGATION
GEOTECHNICAL EVALUATION**

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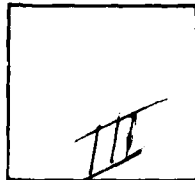
**VOLUME
NEVADA-UTAH
VERIFICATION STUDIES, FY
GEOTECHNICAL DATA
WHITE RIVER NORTH, CDP, NEVADA**

**PREPARED FOR
SPACE AND MISSILE SYSTEMS ORGANIZATION (SAMSO)
NORTON AIR FORCE BASE, CALIFORNIA**

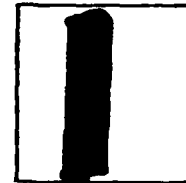
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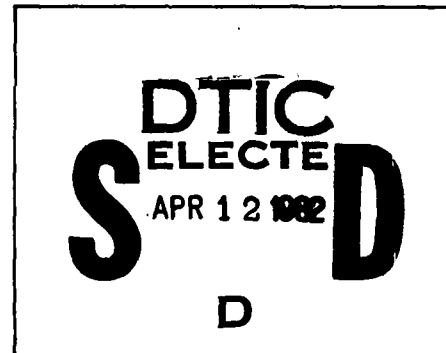
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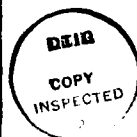
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The report objectives of this report are to verify suitable area for UX system + provide pre-physical + engineering charac- teristics of the soils. included are basic data consisting of boring and trench logs, seismic refraction surveys, sieve analyses, soils, electric resistivity, depth to water, and depth to rocks.		

MX SITING INVESTIGATION
GEOTECHNICAL EVALUATION
VOLUME V, NEVADA-UTAH
VERIFICATION STUDIES, FY 79
GEOTECHNICAL DATA
WHITE RIVER NORTH CDP, NEVADA

Prepared for:

U. S. Department of the Air Force
Space and Missile Systems Organization (SAMSO)
Norton Air Force Base, California 92409

Prepared by:

Fugro National, Inc.
3777 Long Beach Boulevard
Long Beach, California 90807

24 August 1979

VOLUME V
GEOTECHNICAL DATA, WHITE RIVER NORTH CDP

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FOREWORD

This report was prepared for the Department of the Air Force, Space and Missile Systems Organization (SAMSO), in compliance with Contract No. F04704-78-C-0027, CDRL Item 005A2. It presents geological, geophysical, and geotechnical data and evaluates the suitability of portions of Nevada and Utah for siting the MX Land Mobile Advanced ICBM System.

This report is the first of several Verification reports which will be prepared. The objectives are to verify sufficient suitable area for deployment of the MX System and to provide preliminary physical and engineering characteristics of the soils. The Verification Studies are the final phase of a site-selection process which was begun in 1977. Previous studies have been termed Screening, Characterization, and Ranking. In preparing this report, it has been assumed that the reader is familiar with these previous studies.

Results of the FY 79 Verification studies are contained in 11 volumes as follows:

Geotechnical Results

Volume 1A - Sections 1.0, 2.0, and 3.0 contain Introduction, Results and Conclusions, and Recommendations for Future Studies. Sections 4.0 through 6.0 contain summary geotechnical data for Whirlwind, Snake East, and Hamlin CDP's.

Volume 1B - Sections 7.0 through 10.0 contain summary geotechnical data for White River North, Garden-Coal, Reveille-Railroad and Big Smoky CDP's.

Geotechnical Data Volumes

Volume	II - Whirlwind CDP
Volume	III - Snake East CDP
Volume	IV - Hamlin CDP
* Volume	V - White River North CDP
Volume	VI - Garden-Coal CDP
Volume	VII - Reveille-Railroad CDP
Volume	VIII - Big Smoky CDP
Volume	IX - Dry Lake CDP
Volume	X - Ralston CDP

* This volume is presented herein.

SECTION 1.0
GEOLOGIC STATION DATA

EXPLANATIONS OF GEOLOGIC STATION DATA

Geologic stations were established at selected locations throughout the CDP at which detailed descriptions of surficial basin-fill deposits or rock were recorded. Locations of all geologic stations are shown in Drawing 1, Activity Location Map. All data taken on surficial basin-fill units at these stations are listed in Table 1-1 and an explanation of the column headings in the table is given below. At stations where rock descriptions were made, only geologic unit designations are listed. A general explanation of all geologic unit symbols used in Verification Studies is included at the end of this section.

Column Heading
Table 1-1

Explanation

Station Number	Geologic stations are numbered sequentially. Where more than one geologic field team worked in a CDP, stations made by each team are differentiated with a letter (A, B, or C) following the station number.
Geologic Unit	Generic geologic unit only, i.e. the grain-size designation (f, s, g, c) is omitted from surficial basin-fill units. The letter B in the unit designation indicates a buried deposit not exposed at the surface.
MPS MM	Average maximum particle size in millimeters.
Grain Size (%B, %C, %G, %S, %F)	Estimated particle size distribution using the Unified Soil Classification System. Percentages of boulders (%B) and cobbles (%C) are based on the entire deposit, whereas percentages of gravel (%G), sand (%S) and fines (%F) are taken only on the fraction composed of particles less than 3 inches (76 mm) in diameter.
USCS	Soil class according to the Unified Soil Classification System.

Munsell Color Soil color based on Munsell Soil Color Chart.

Source Rock Rock types of coarse clasts listed in order of
Types(s) abundance.

* Physical
Properties Data listed in columns 6 through 15 address
specific soil properties. These are listed
below in parentheses following the column
heading number and are also listed at the
bottom of Table 1-1. Data are coded with each
numerical entry referring to a specific soil
condition as listed below.

- 6 (Grain Shape) 1) Angular, 2) Subangular, 3) Subrounded,
4) Rounded, 5) Well rounded
- 7 (Moisture 1) Dry, 2) Moist, 3) Wet
Content)
- 8 (Plasticity 1) None, 2) Low, 3) Medium, 4) High
of Fines)
- 9 (Consistency) Coarse grained: 1) Very Loose, 2) Loose,
3) Medium Dense, 4) Dense, 5) Very Dense,

Fine grained: 1) Soft, 2) Firm, 3) Stiff,
4) Hard
- 10 (Structure) 1) Stratified Tabular, 2) Stratified Other
(lensed, cross bedded, discontinuous beds),
3) Nonstratified
- 11 (Cementation 1) None, 2) Weak, 3) Moderate, 4) Strong
Induration)
- 12 (Depth to Depth to layer (in centimeters) exhibiting
Cemented cementation induration described in Column 11
Layers) (above)
- 13 (Weathering 1) Fresh, 2) Slight, 3) Moderate, 4) Very
of clasts)
- 14 (Soil 1) None (A-C profile), 2) Poor (incipient
Profile B-horizon), 3) Well (prominant B-horizon)
Development)
- 15 (Caliche 1) Stage I, 2) Stage II, 3) Stage III,
Development) 4) Stage IV, 5) None

Drainage

DP (M)	Average depth of drainages (in meters)
WD (M)	Average width of drainages (in meters)

Slope (%)	Average slope of ground surface (in percent grade)
-----------	--

Sample	Number of samples taken
--------	-------------------------

GENERALIZED GEOLOGIC UNITSExplanation

Surficial Basin-fill Units

- A1 Younger Fluvial Deposits - Major modern stream channel and flood-plain deposits.
- A2 Older Fluvial Deposits - Older incised stream channel and flood-plain deposits in elevated terraces bordering major modern drainages.
- A3 Eolian Deposits - Wind-blown deposits of sand occurring as either thin sheets (A3s) or dunes (A3d).
- A4 Playa and Lacustrine Deposits - Deposits occurring in modern, active playas (A4) or in either inactive playas or older lake beds and abandoned shorelines associated with extinct lakes (A4o).
- A5 Alluvial Fan Deposits - Alluvial deposits consisting of debris flow and water-laid alluvium near mountain fronts, grading into predominantly water-laid alluvium deposited in shifting distributary channels near the basin center. Younger (A5y), intermediate (A5i), and older (A5o) alluvial fans are differentiated by surface soil development, terrain conditions, and present depositional/erosional environment.

Grain sizes of these deposits (except A3 deposits, which are exclusively sandy) are indicated by a single letter (f, s, g, or c) following the geologic unit symbol. These letters indicate the predominant grain size and range of soil types according to the Unified Soil Classification System:

f - fine-grained (ML, CL, MH, CH)

s - sands (SP, SW, SM, SC)

g - gravels (GP, GW, GM, GC)

c - coarse grained with greater than 30 percent boulders and cobbles (generally GP, GW, GM, GC)

ROCK UNITS

- I Igneous (undifferentiated). Rocks formed by solidification of a molten or partially molten mass.
 - I1 Intrusive - Plutonic rocks formed by solidification of molten material beneath the surface (e.g., granite, granodiorite, diorite, gabbro).
 - I2 Extrusive (intermediate and acidic) - Volcanic rocks of intermediate and acidic composition formed by solidification of molten material at or near the surface, (e.g., rhyolite, latite, dacite, andesite).
 - I3 Extrusive (basic) - Volcanic rocks of basic composition, generally formed by solidification of molten materials at or near the surface (e.g., basalt).
 - I4 Extrusive (pyroclastic) - Rocks formed by accumulation of volcanic ejecta (e.g., ash, tuff, welded tuff, agglomerate).
- S Sedimentary (undifferentiated) - Rocks formed by accumulation of clastic solids, organic solids and/or chemically precipitated minerals.
 - S1 Arenaceous and/or Siliceous Rocks - Composed of sand size particles (e.g., sandstone, orthoquartzite) or of cryptocrystalline silica (e.g., opal, chert).
 - S2 Carbonate Rocks - Composed predominantly of calcium carbonate detritus or chemical precipitates (e.g., limestone, dolomite, chalk).
 - S3 Argillaceous Rocks - Composed of clay and silt-sized particles (e.g., siltstone, shale, claystone).
 - S4 Evaporite Rocks - Precipitated from solution as a result of evaporation (e.g., halite, gypsum, anhydrite, sylvite).
 - S5 Coarse Clastic Rocks - Composed of gravel sized or larger clasts (e.g., conglomerate, breccia).
- M Metamorphic (undifferentiated) - Rocks formed through recrystallization in the solid state of preexisting rocks by heat and pressure (e.g., gneiss, schist, hornfels, metaquartzite).

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SECTION 2.0
GROUND-WATER DATA

EXPLANATIONS OF GROUND-WATER DATA

Existing ground-water data were collected from all available sources. These data were updated where possible from measurements taken during Fugro field operations, and all data are shown on Table 2-1. Locations of water wells and boreholes in which water-level measurements were available are shown in Drawing 1. Well numbers listed in Column 1 (Table 2-1) refer to well locations in Drawing 1. Actual well numbers giving location according to the Bureau of Land Management Land Survey System are shown in Column 2.

Water levels generally refer to the static ground-water table in the unconfined basin-fill aquifer. Perched conditions or levels in artesian aquifers are noted where known.

WELL NO.	WELL LOCATION NUMBER*	ELEVATION OF GROUND SURFACE - FEET (METERS) ABOVE M.S.L.	DEPTH OF WELL - FEET (METERS)	WATER LEVEL			REFERENCES**/REMARKS
				DEPTH BELOW GROUND SURFACE - FEET (METERS)	DATE MEASURED	ELEVATION - FEET (METERS) ABOVE M.S.L.	
W1	12N/62E-29B	5553 (1709)	112 (34)	26 (8)	1947	5527 (1701)	2
W2	12N/62E-30B	5558 (1710)	-	37 (11)	1947	5521 (1699)	2
W3	12N/62E-30C	5530 (1702)	50 (15)	22 (7)	1947	5508 (1695)	2
W4	12N/62E-33A	5594 (1721)	48 (15)	40 (12)	1947	5554 (1709)	2
W5	12N/62E-33D	5531 (1702)	-	24 (7)	1947	5507 (1694)	2
W6	11N/61E-16D	5470 (1683)	82 (25)	28 (9)	1948	5442 (1674)	2
W7	11N/61E-25B	5440 (1674)	-	15 (5)	1978	5425 (1669)	1
W8	11N/61E-27A	5440 (1674)	-	11 (3)	1978	5429 (1670)	1
W9	11N/61E-32B	5431 (1702)	48 (15)	43 (13)	1978	5388 (1658)	1
W10	11N/61E-35D	5417 (1667)	-	15 (5)	1978	5402 (1662)	1
W11	11N/61E-35D	5412 (1665)	171 (53)	14 (4)	1945	5398 (1661)	2
W12	11N/62E-4B	5531 (1702)	55 (17)	43 (13)	1948	5488 (1689)	2
W13	11N/62E-5D	5520 (1698)	30 (9)	3 (1)	1948	5517 (1698)	2
W14	11N/62E-6A	5503 (1693)	10 (3)	5 (2)	1947	5498 (1692)	2
W15	11N/62E-7B	5480 (1686)	-	18 (6)	1947	5462 (1681)	2
W16	11N/62E-17C	5460 (1680)	15 (5)	7 (2)	1948	5453 (1678)	2

* Mt. Diablo Baseline and Meridian

** References:

(1) Fugro field measurements (1978)

(2) U.S. Geological Survey (1978)

NOTE: All wells tap unconfined alluvial aquifers except where noted. Where published data are lacking or inaccurate, ground surface elevations are taken from topographic maps.

GROUND-WATER DATA
VERIFICATION SITE
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

TABLE
2-1
1 OF 3

FUGRO NATIONAL, INC.

WELL NO.	WELL LOCATION NUMBER*	ELEVATION OF GROUND SURFACE - FEET (METERS) ABOVE M.S.L.	DEPTH OF WELL - FEET (METERS)	WATER LEVEL			REFERENCES**/REMARKS
				DEPTH BELOW GROUND SURFACE - FEET (METERS)	DATE MEASURED	ELEVATION - FEET (METERS) ABOVE M.S.L.	
W17	11N/62E-19C	5442 (1674)	-	7 (2)	-	5435 (1672)	2
W18	11N/62E-28A	5639 (1735)	-	43 (13)	1978	5596 (1722)	1
W19	11N/62E-33D	5661 (1742)	130 (40)	7 (2)	1978	5654 (1740)	2
W20	10N/60E-13C	5390 (1658)	-	50 (15)	1948	5340 (1643)	2
W21	10N/60E-24D	5374 (1653)	-	41 (13)	1948	5333 (1641)	2
W22	10N/60E-36B	5356 (1648)	-	50 (15)	1978	5306 (1633)	1
W23	10N/61E-11D	5376 (1654)	-	5 (2)	1947	5371 (1653)	2
W24	10N/61E-20A	5366 (1651)	-	22 (7)	1978	5344 (1644)	1
W25	10N/61E-26B	5344 (1644)	-	9 (3)	1947	5335 (1642)	2
W26	10N/61E-34A	5334 (1641)	-	6 (2)	1947	5328 (1639)	2
W27	10N/62E-17A	5762 (1773)	-	259 (80)	1978	5503 (1693)	1
W28	10N/62E-19A	5630 (1732)	-	149 (46)	1978	5481 (1686)	1
W29	9N/59E-5D	5885 (1810)	44 (14)	39 (12)	1957	5846 (1799)	2
W30	9N/60E-1A	5346 (1645)	40 (12)	50 (15)	1978	5296 (1630)	1
W31	9N/60E-15D	5505 (1694)	-	195 (60)	1978	5310 (1634)	1
W32	9N/61E-78	5341 (1643)	43 (13)	31 (10)	1948	5310 (1634)	2

* Mt. Diablo Baseline

** References:

- (1) Fugro field measurements (1978)
- (2) U.S. Geological Survey (1978)

GROUND-WATER DATA
VERIFICATION SITE
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

TABLE
2-1
2 OF 3

FUGRO NATIONAL, INC.

NOTE: All wells tap unconfined alluvial aquifers except where noted. Where published data are lacking or inaccurate, ground surface elevations are taken from topographic maps.

WELL NO.	WELL LOCATION NUMBER*	ELEVATION OF GROUND SURFACE - FEET (METERS) ABOVE M.S.L.	DEPTH OF WELL - FEET (METERS)	WATER LEVEL			REFERENCES**/REMARKS
				DEPTH BELOW GROUND SURFACE - FEET (METERS)	DATE MEASURED	ELEVATION - FEET (METERS) ABOVE M.S.L.	
W33	8N/59E-3C	6660 (2049)	100 (31)	85 (26)	1967	6575 (2023)	2
W34	8N/60E-21A	5490 (1689)	-	500+ (154)	1978	<4990 (<1535)	2
W35	8N/60E-24D	5261 (1615)	-	35 (11)	1978	5226 (1608)	2
W36	8N/60E-27D	5480 (1686)	142 (44)	116 (36)	1948	5364 (1650)	2
W37	8N/60E-28A	5340 (1643)	-	117 (36)	1978	5223 (1607)	1
W38	8N/61E-33A	5250 (1615)	-	36 (11)	1978	5214 (1604)	1
W39	7N/61E-4D	5245 (1614)	-	39 (12)	1978	5206 (1602)	1
W40	6N/60E-21A	5240 (1612)	-	89 (27)	1978	5151 (1585)	1
W41	4N/61E-16D	5094 (1567)	-	84 (26)	1963	5010 (1542)	2
W42	4N/61E-36A	5040 (1551)	-	90 (28)	-	4950 (1523)	2

* Mt. Diablo Baseline and Meridian

** References:

1. Fugro field measurements (1978)
2. U.S. Geological Survey (1978)

GROUND-WATER DATA
VERIFICATION SITE
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

TABLE
2-1
3 OF 3

NOTE: All wells tap unconfined alluvial aquifers except where noted. Where published data are lacking or inaccurate, ground surface elevations are taken from topographic maps.

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SECTION 3.0
SEISMIC REFRACTION DATA

EXPLANATIONS OF SEISMIC REFRACTION DATA

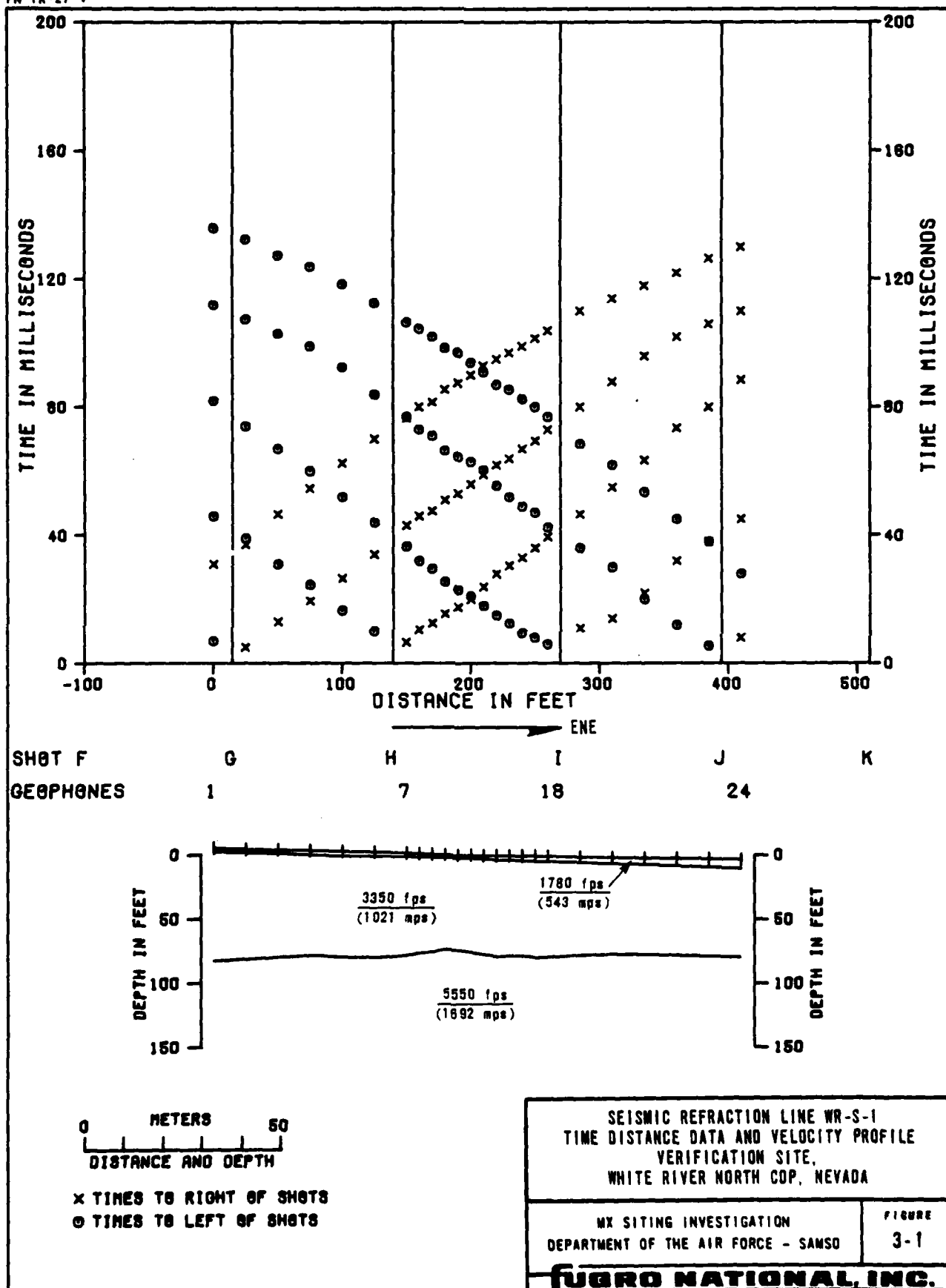
Each figure shows seismic wave travel times plotted versus surface distance between the energy source (shot) and the detector (geophone) for a single seismic line. Distances are measured along the line from geophone number 1 which is designated as zero distance. Distances to the right (on the paper) of geophone 1 are positive. The direction arrow gives the approximate direction of the geophone array from geophone 1 to geophone 24.

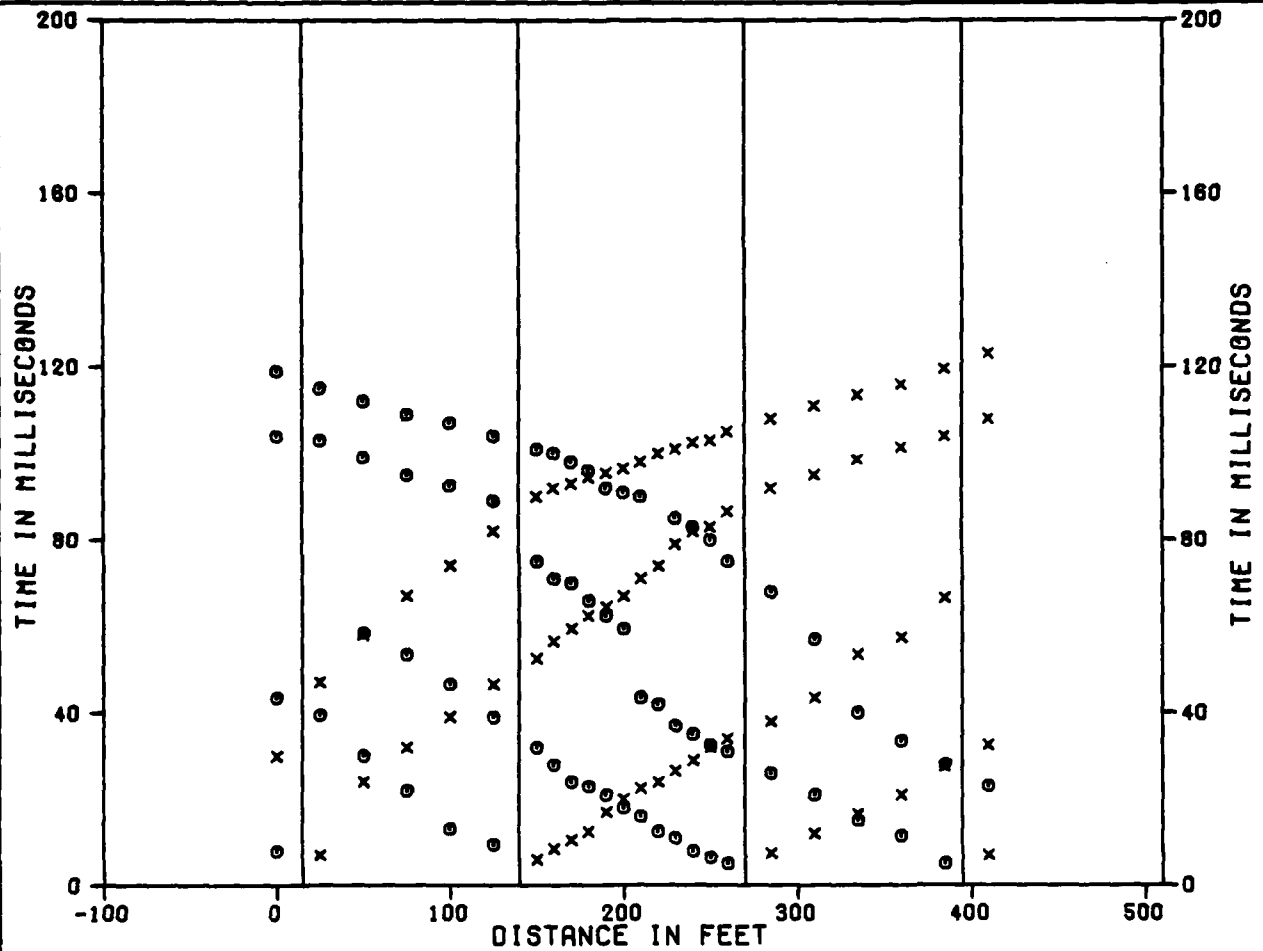
Travel Time Versus Distance Graph (Upper Half of Figure)

This is a travel time versus distance graph. The abscissa represents distance; the ordinate, time. The six vertical lines represent the locations of shots (designated as F, G, H, I, J, and K). The symbol, X, denotes travel times at geophones that were located to the right of a shot. The symbol, @, denotes travel times that were located to the left of shots.

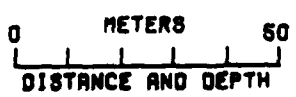
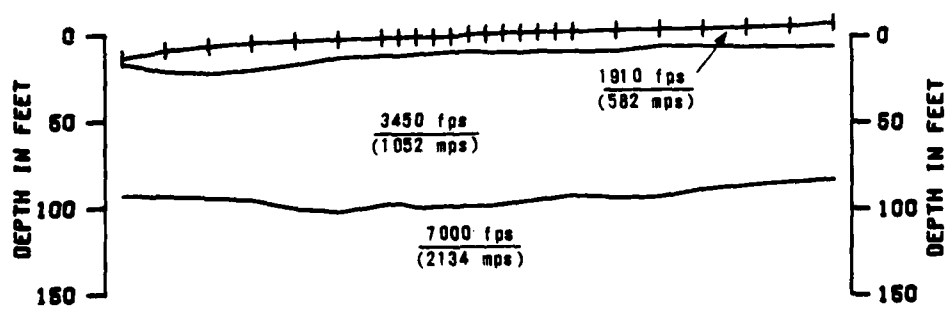
Velocity Cross Section (Lower Half of Figure)

This is an interpreted velocity cross section beneath the seismic line. The top line represents the ground-surface profile. The short vertical lines crossing the top line mark the geophone positions. The depth scale is plotted relative to a point on the line which was arbitrarily chosen as "zero elevation" at the time the line was surveyed. The additional lines across the cross section represent the interpreted boundaries between layers of material with different compressional wave velocities. These boundaries are commonly called "refractors". The velocity interpreted to be representative of each layer is shown.





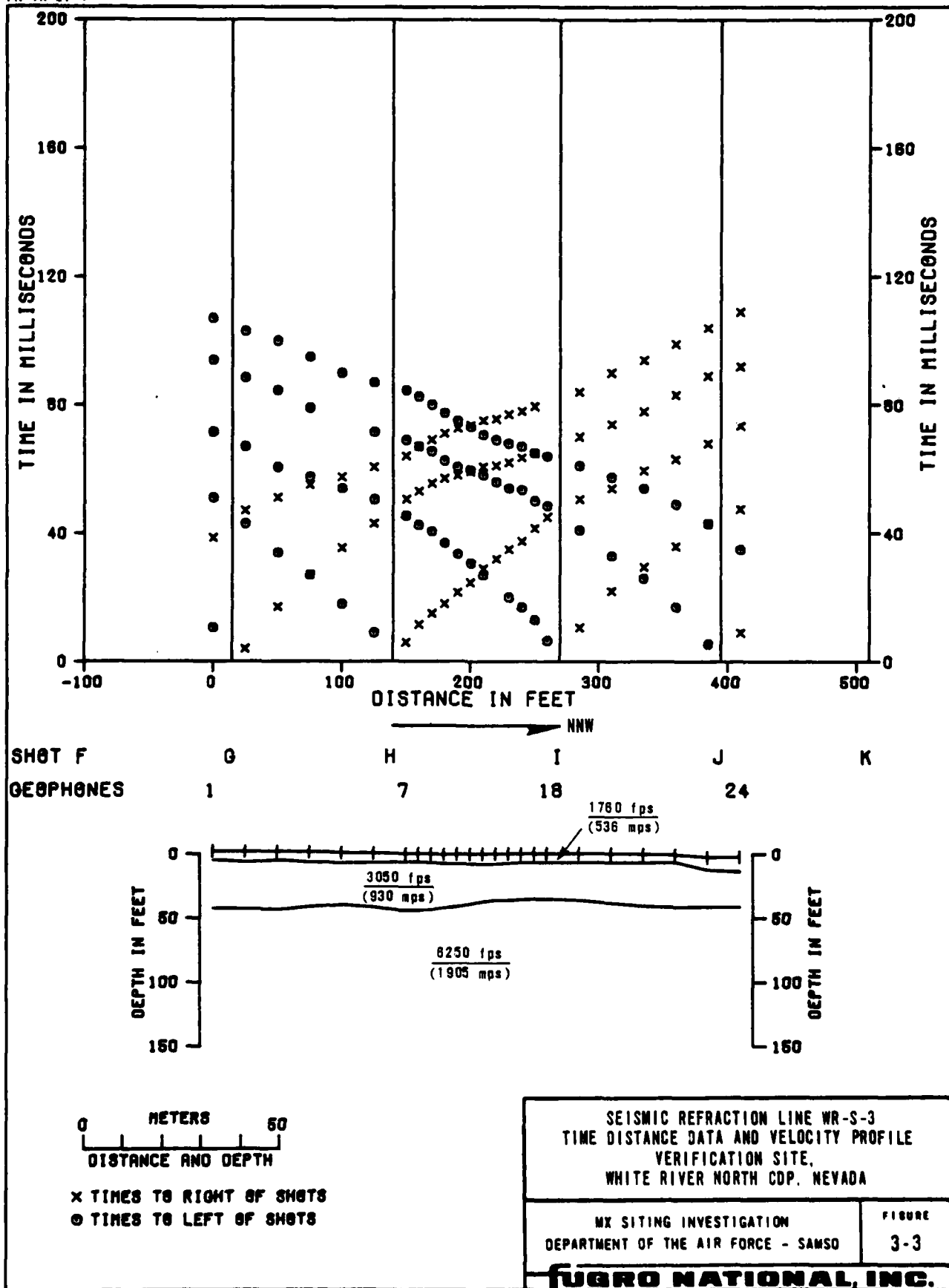
SHOT F G H I J K
 GEOPHONES 1 7 18 24

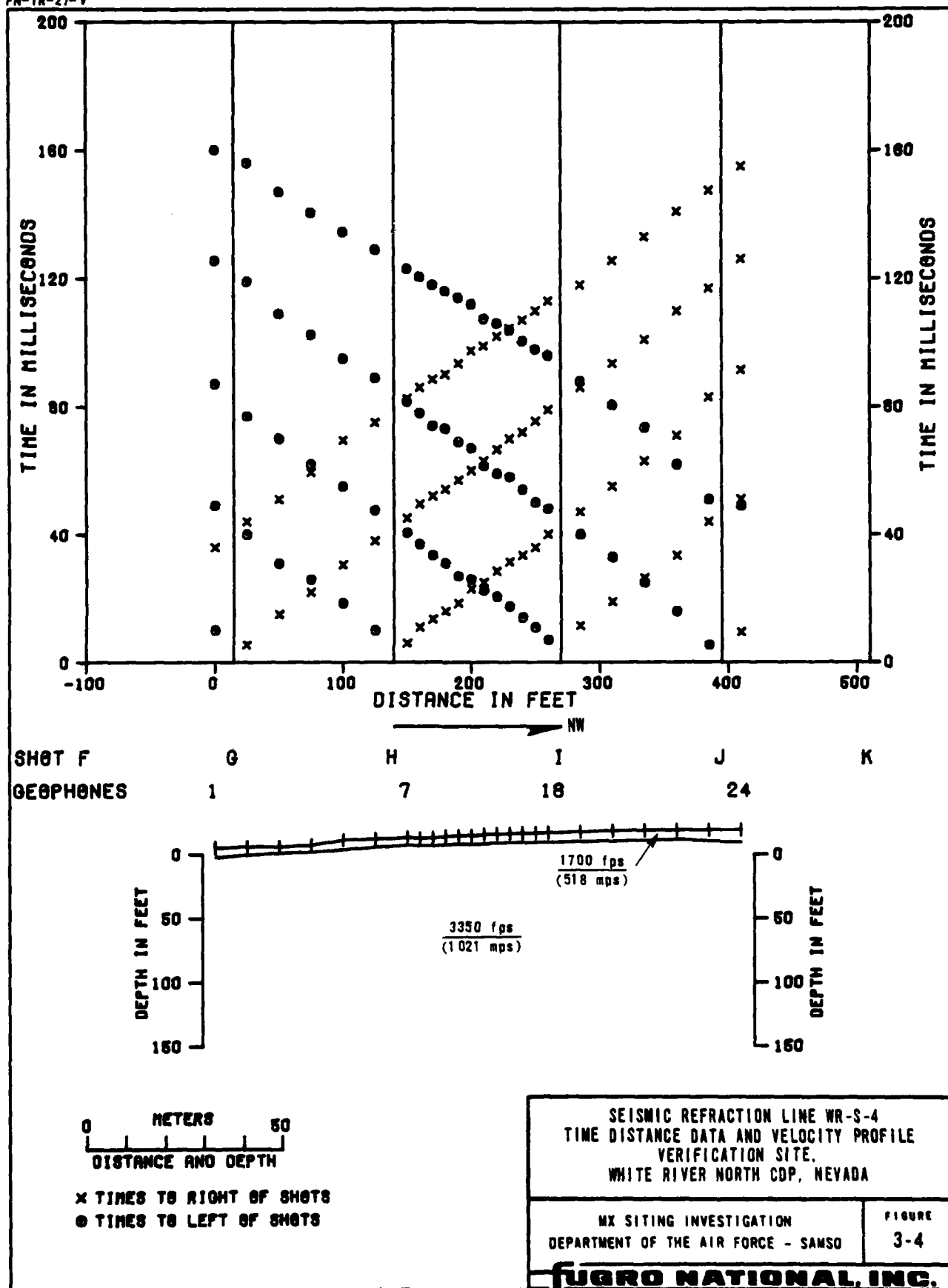


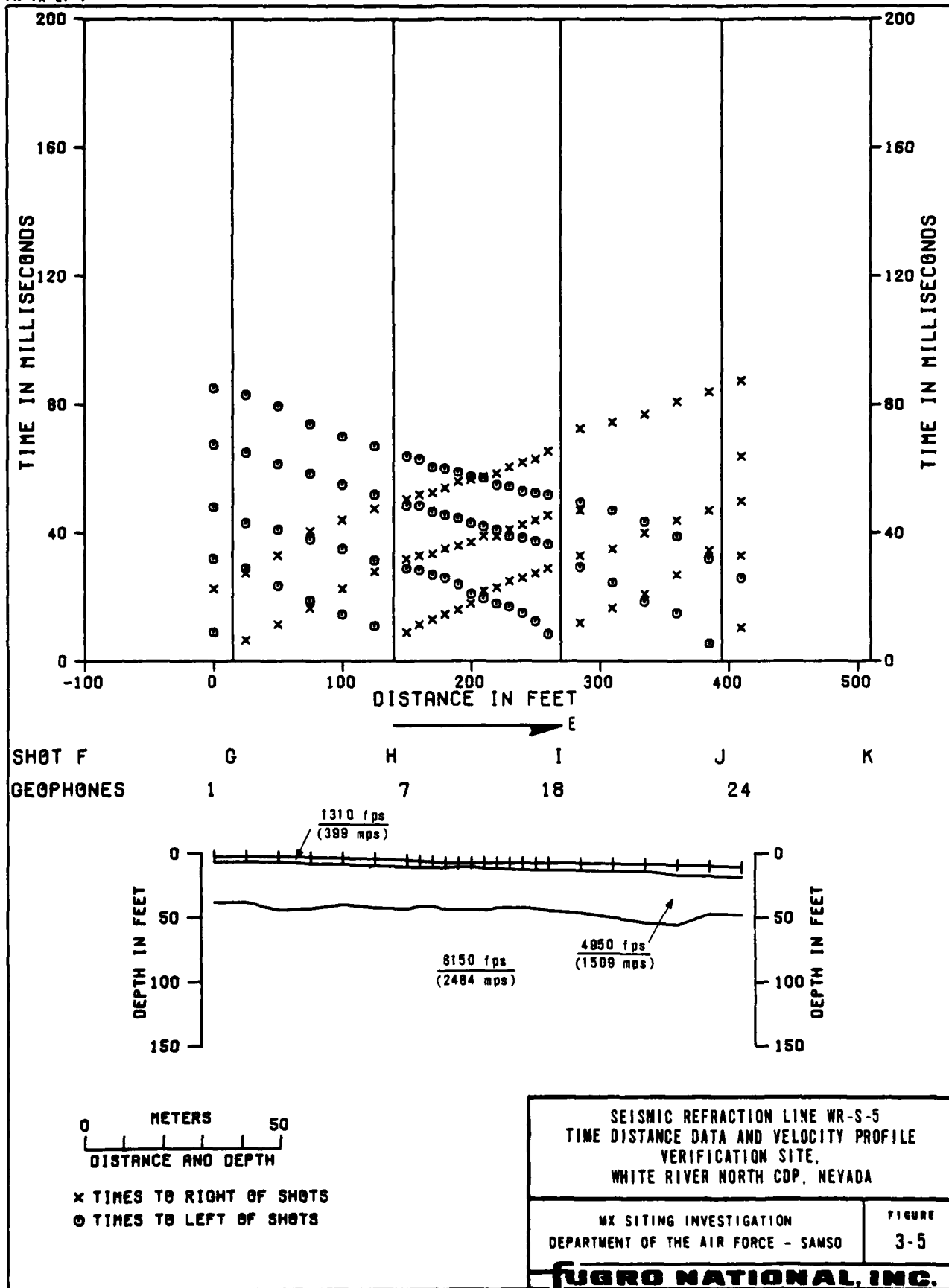
x TIMES TO RIGHT OF SHOTS
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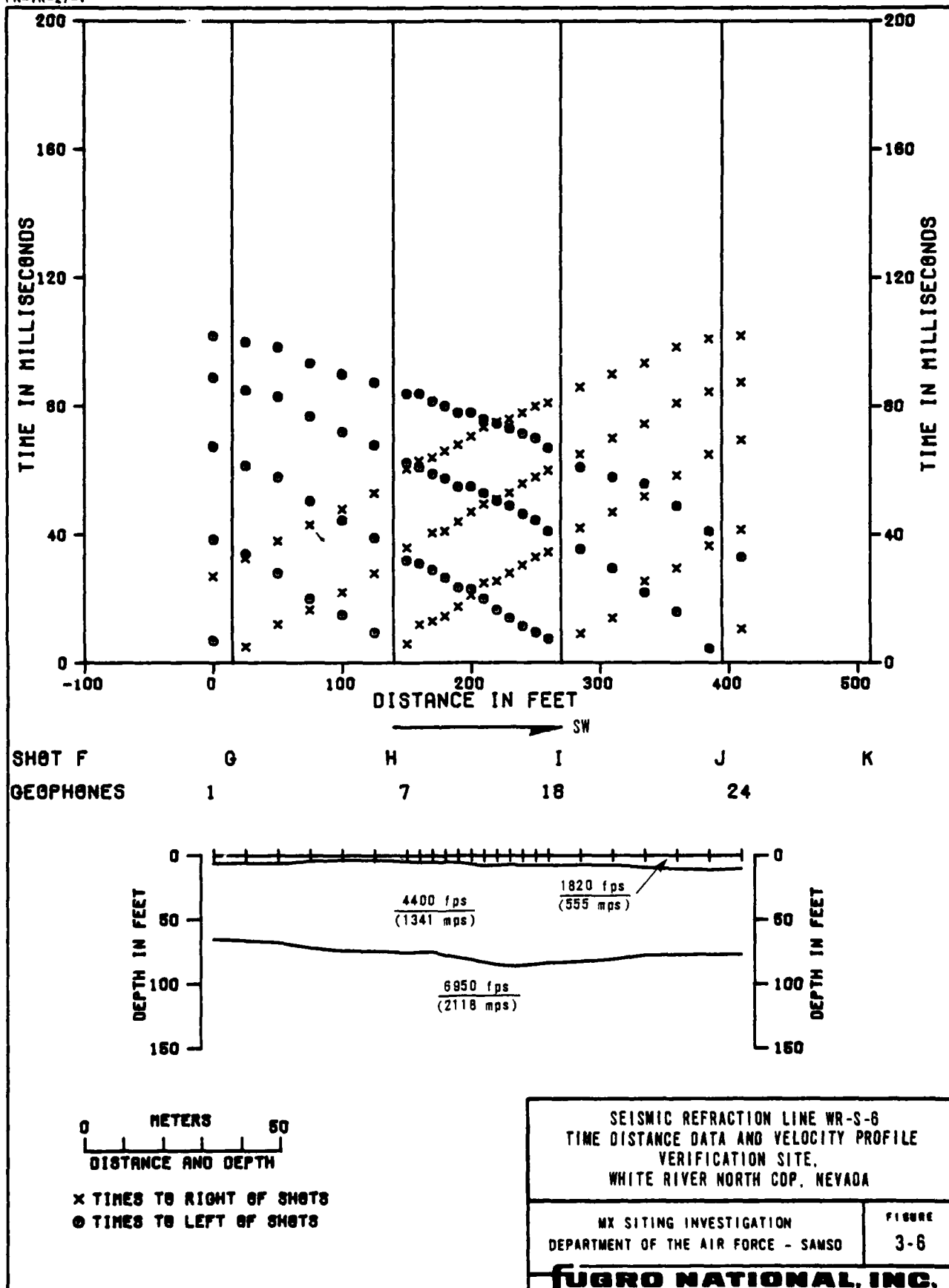
SEISMIC REFRACTION LINE WR-S-2 TIME DISTANCE DATA AND VELOCITY PROFILE VERIFICATION SITE, WHITE RIVER NORTH COP, NEVADA	
MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE - SAMS0	FIGURE 3-2

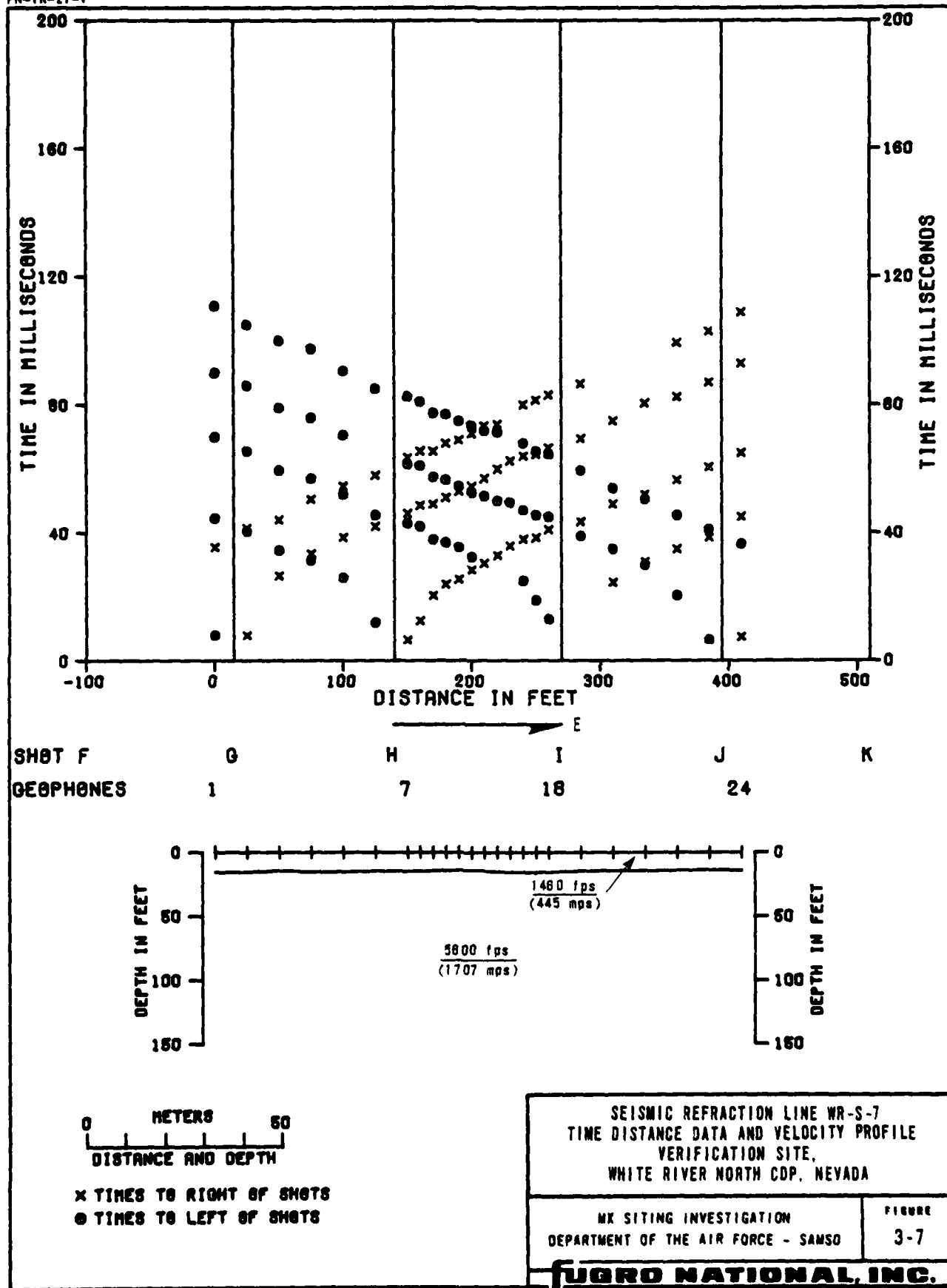
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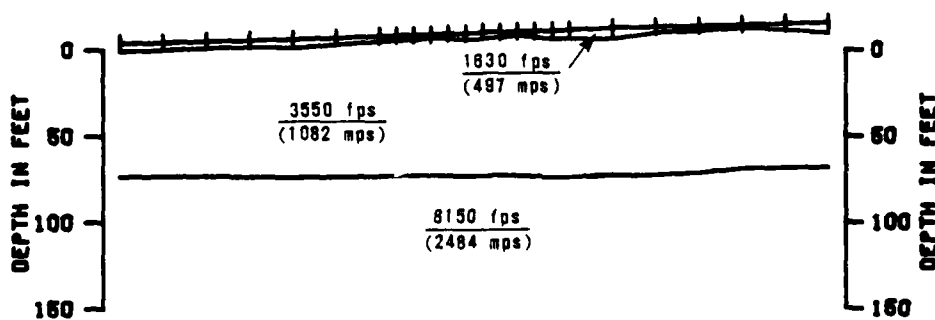
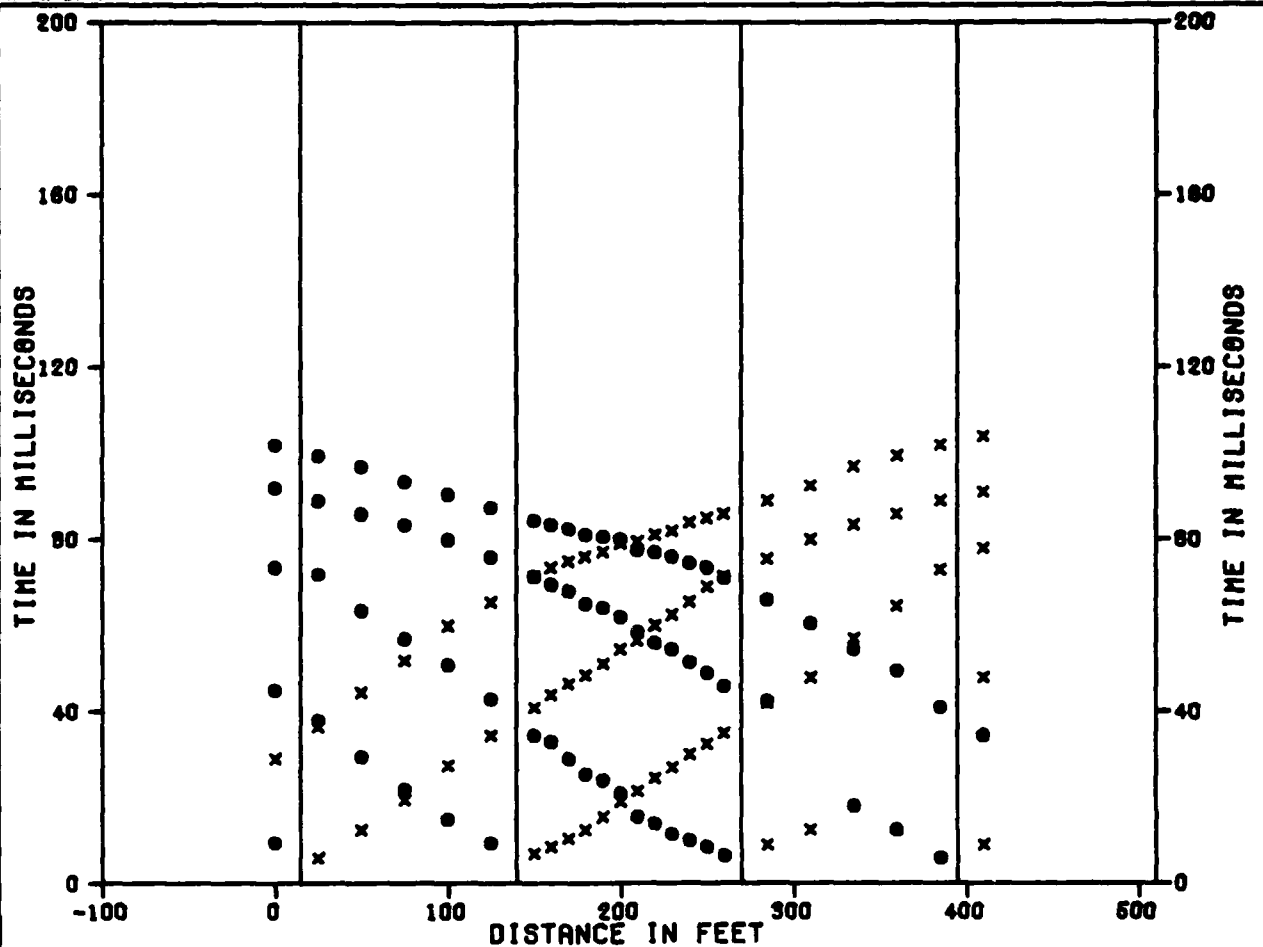












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DISTANCE AND DEPTH

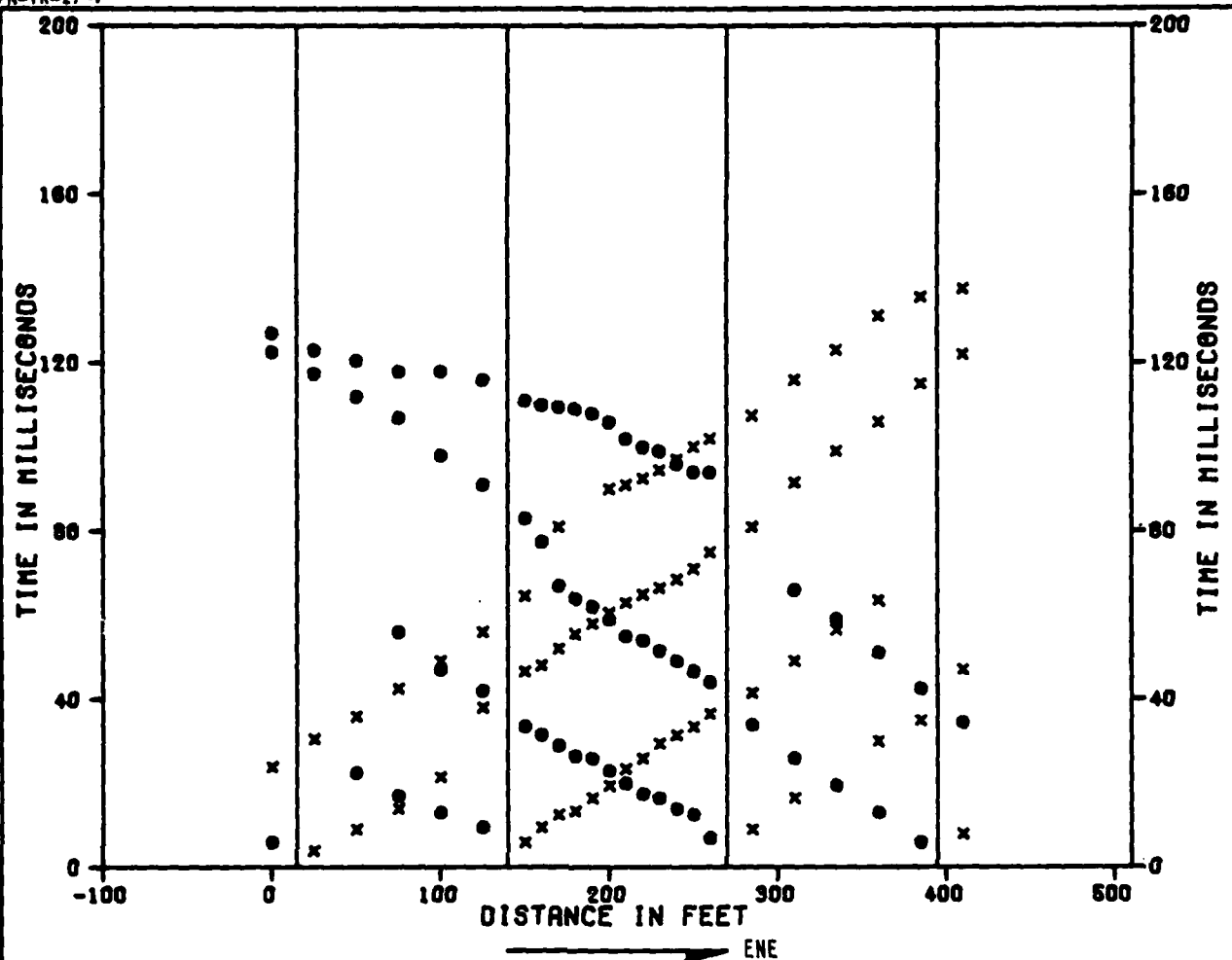
x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE WR-S-8
TIME DISTANCE DATA AND VELOCITY PROFILE
VERIFICATION SITE,
WHITE RIVER NORTH COP, NEVADA

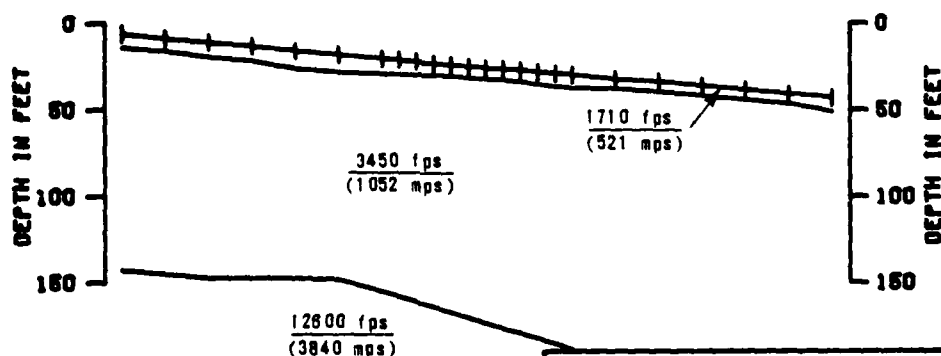
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
3-8

UGRO NATIONAL, INC.



SHOT F	0	H	I	J	K
GEOPHONES	1	7	18	24	



0 METERS 50
DISTANCE AND DEPTH

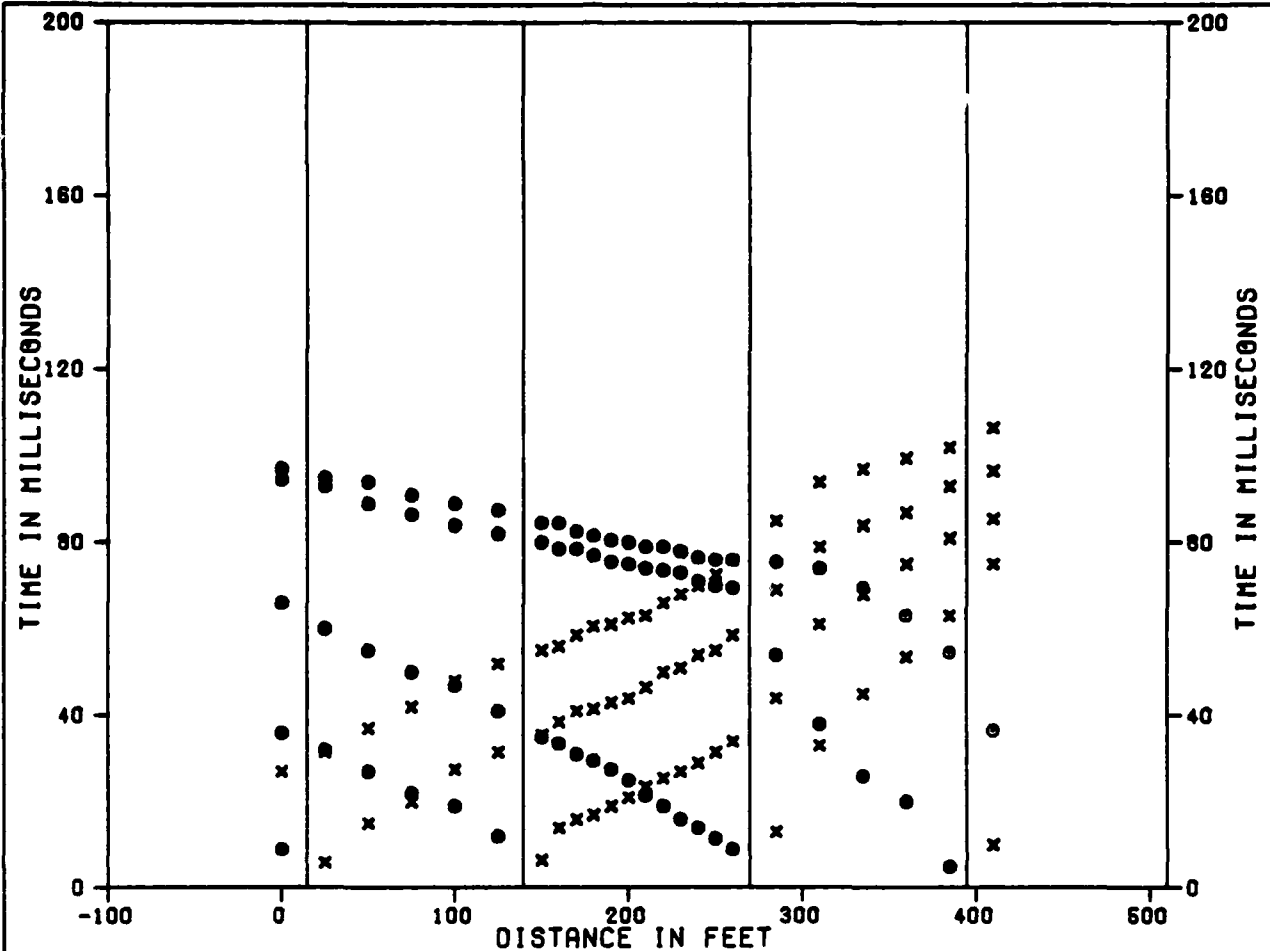
x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE WR-S-8
TIME DISTANCE DATA AND VELOCITY PROFILE
VERIFICATION SITE,
WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSQ

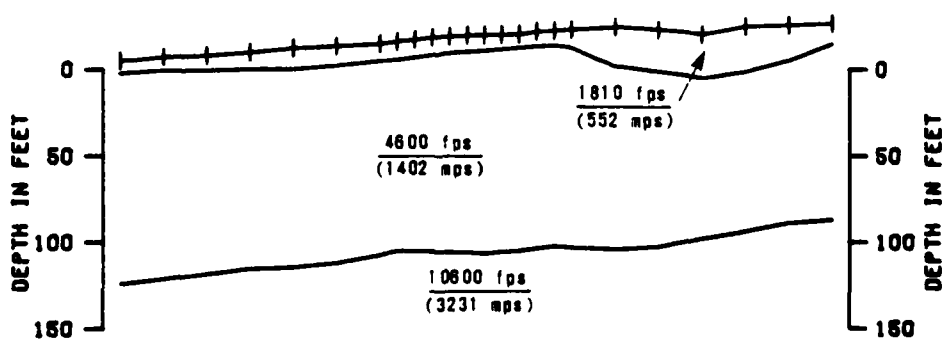
FIGURE
3-9

FUGRO NATIONAL, INC.



SHOT F
GEOPHONES

G H I J K
1 7 18 24



0 METERS 60
DISTANCE AND DEPTH

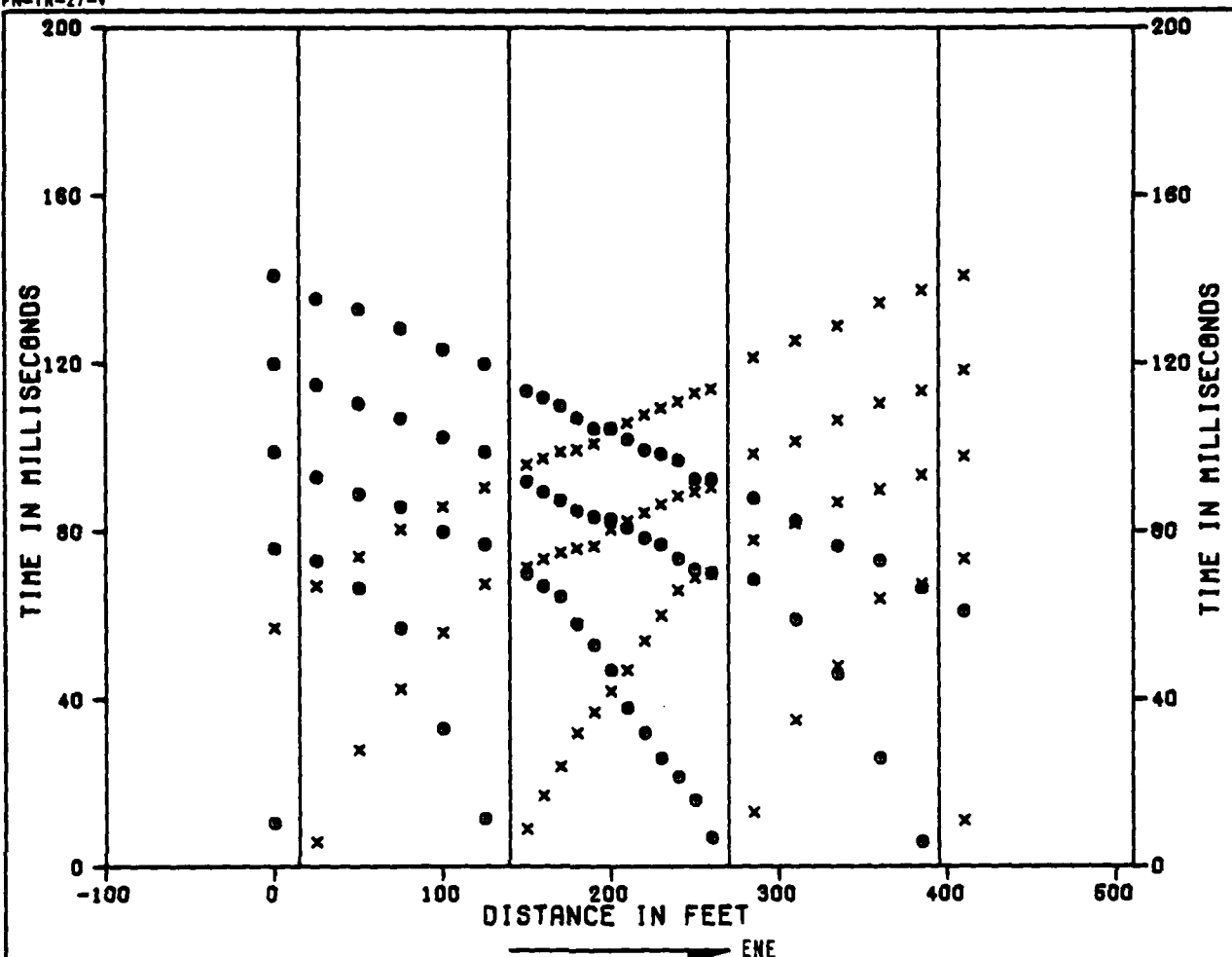
x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE WR-S-11
TIME DISTANCE DATA AND VELOCITY PROFILE
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

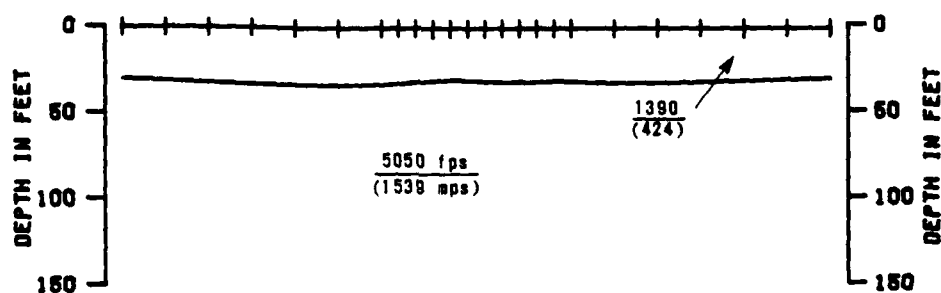
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
3-11

FUGRO NATIONAL, INC.



SHOT F G H I J K
 GEOPHONES 1 7 18 24



0 50
 METERS
 DISTANCE AND DEPTH

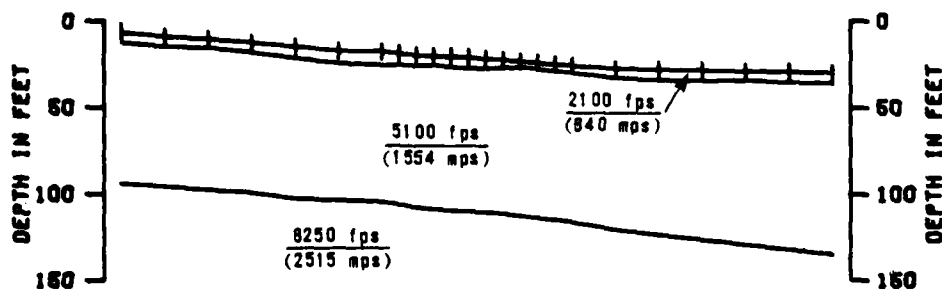
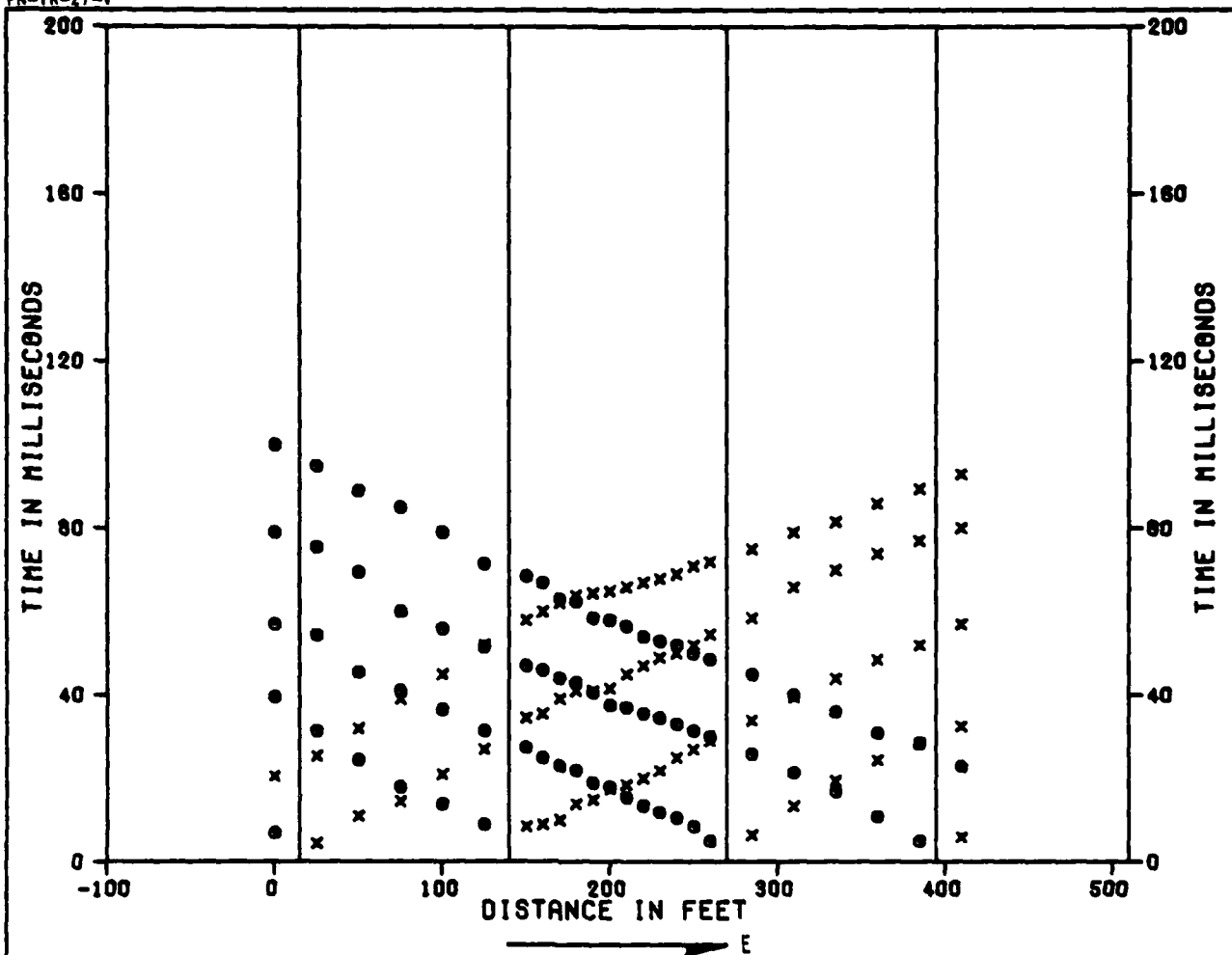
x TIMES TO RIGHT OF SHOTS
 o TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE WR-S-12
 TIME DISTANCE DATA AND VELOCITY PROFILE
 VERIFICATION SITE,
 WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAMS

FIGURE
 3-12

FUGRO NATIONAL, INC.



0 METERS 50
DISTANCE AND DEPTH

x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

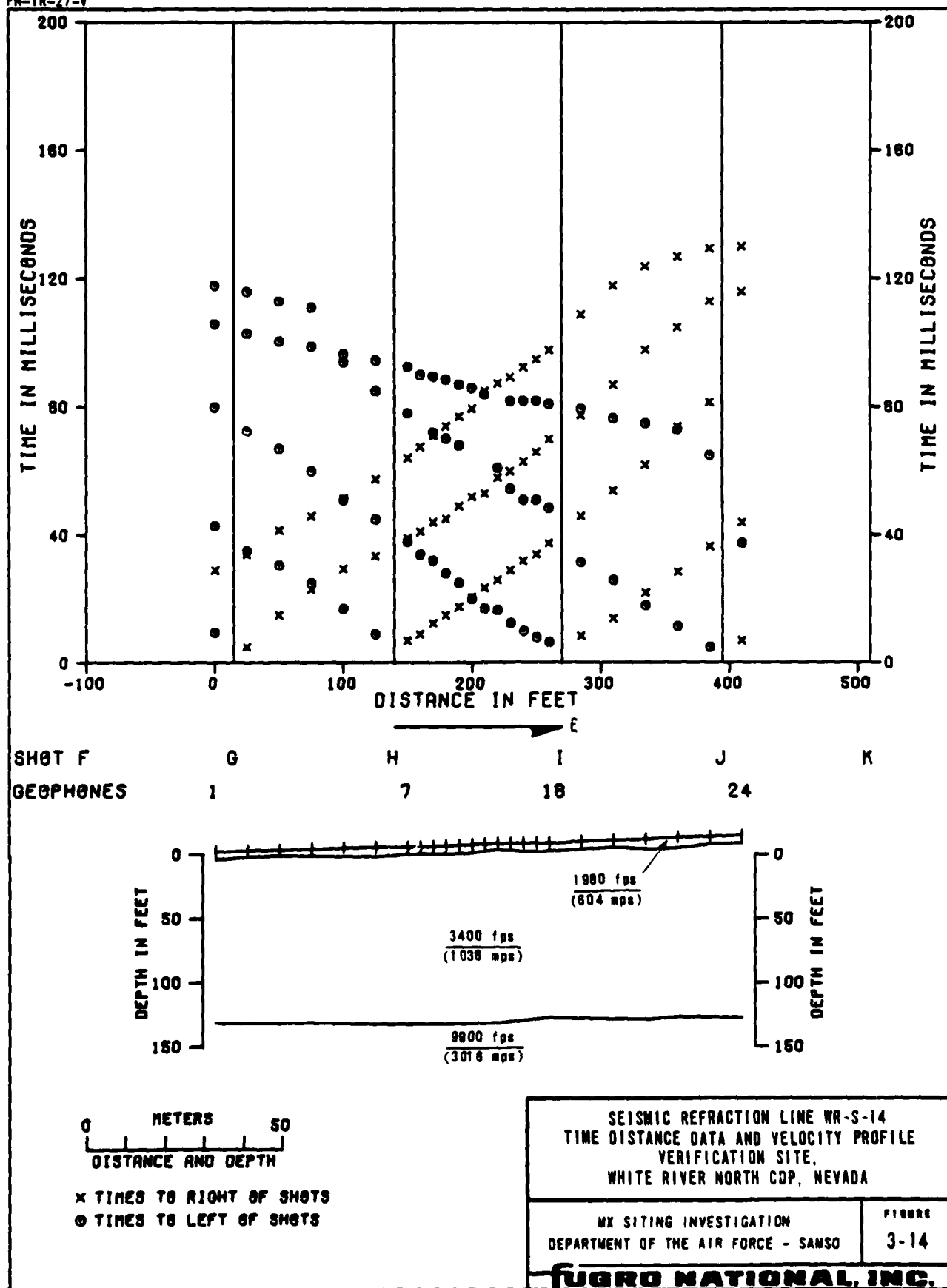
SEISMIC REFRACTION LINE WR-S-13
TIME DISTANCE DATA AND VELOCITY PROFILE
VERIFICATION SITE.
WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

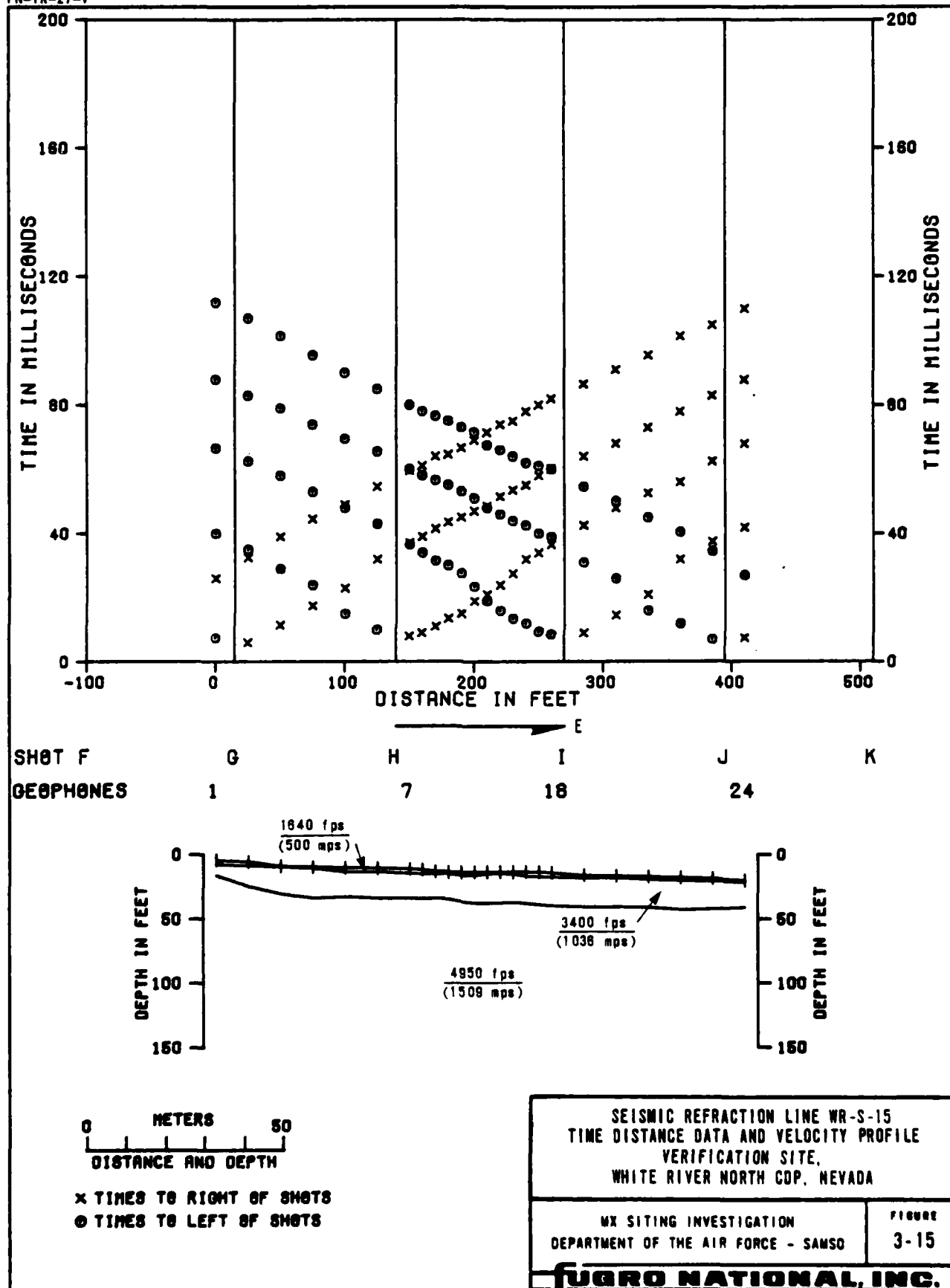
FIGURE
3-13

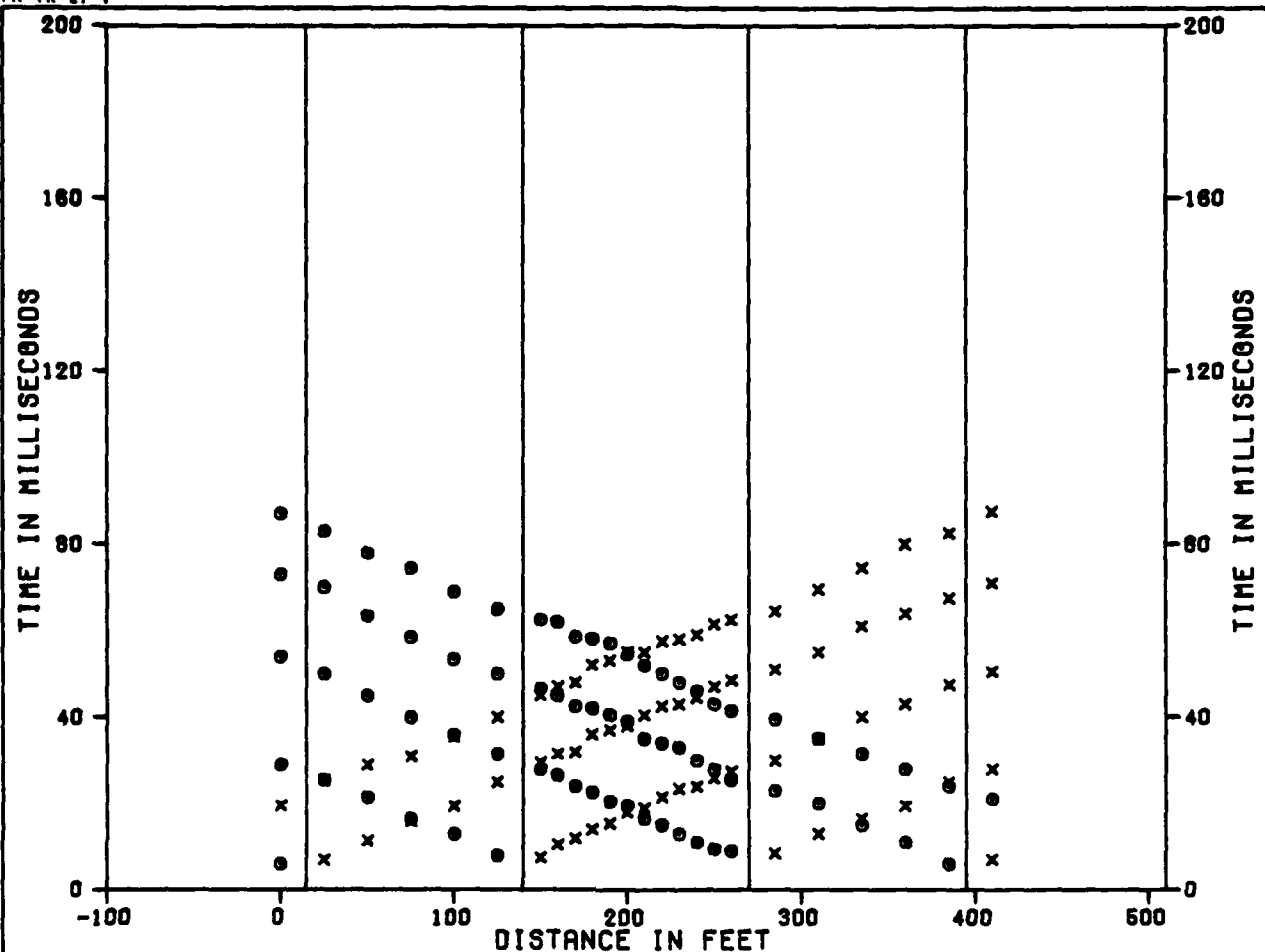
FUGRO NATIONAL, INC.

FM-TR-27-V



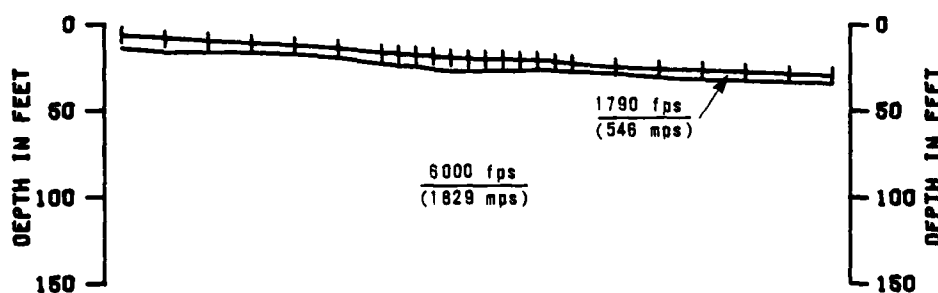
2 JUL 79





SHOT F
GEOPHONES

G H I J K
1 7 18 24



0 METERS 50
DISTANCE AND DEPTH

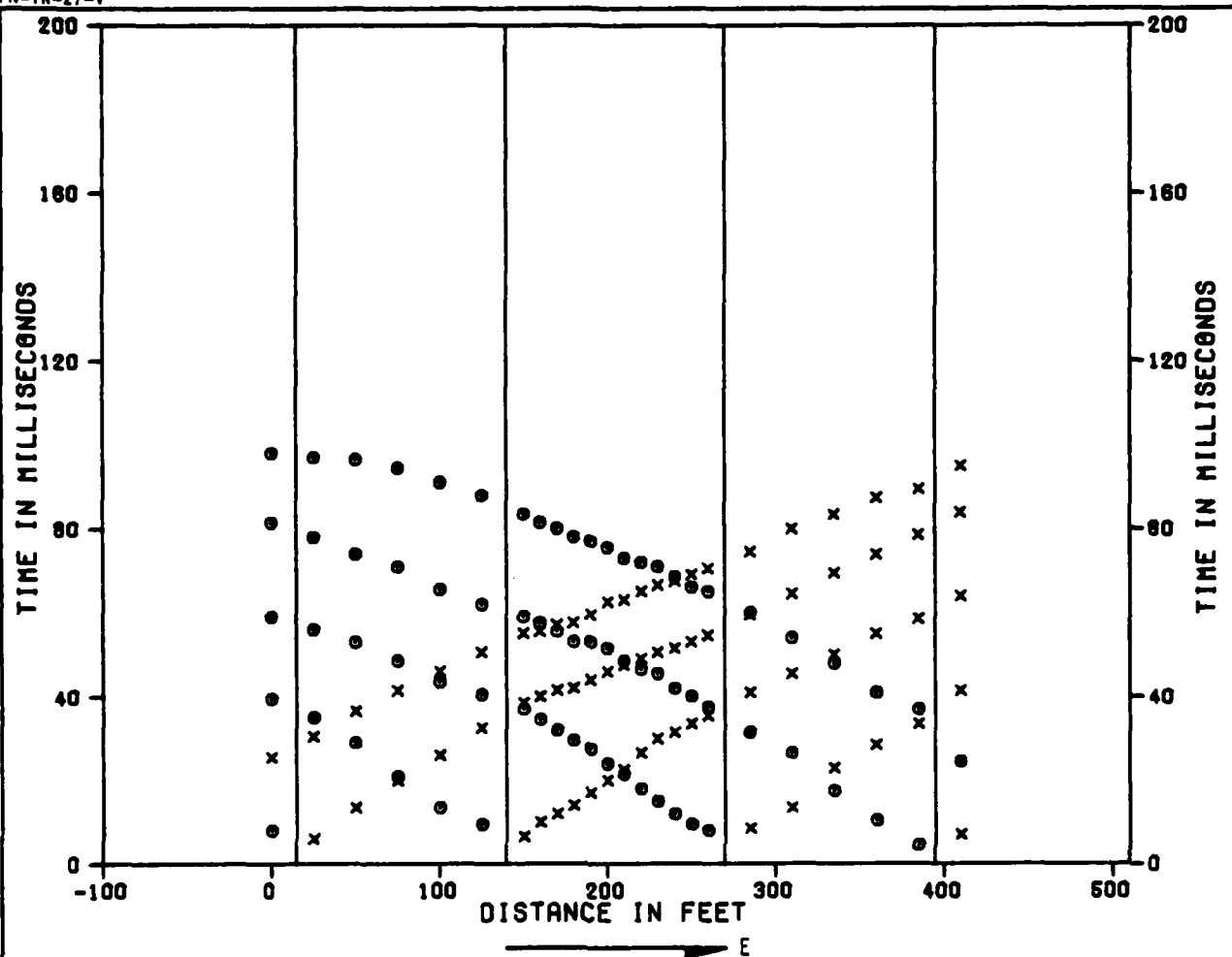
x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE WR-S-16
TIME DISTANCE DATA AND VELOCITY PROFILE
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
3-16

FUGRO NATIONAL, INC.



0 METERS 50
DISTANCE AND DEPTH

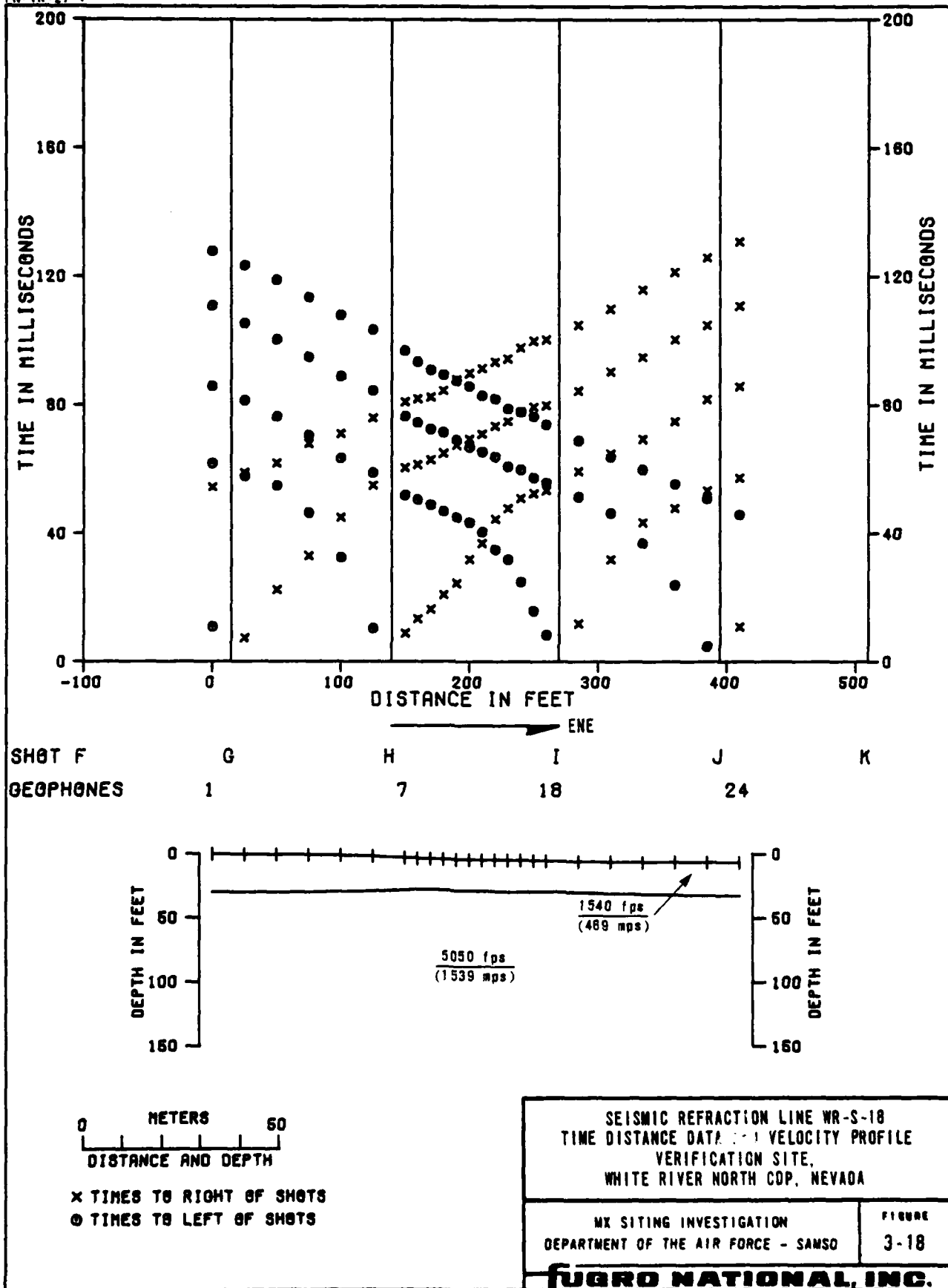
x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

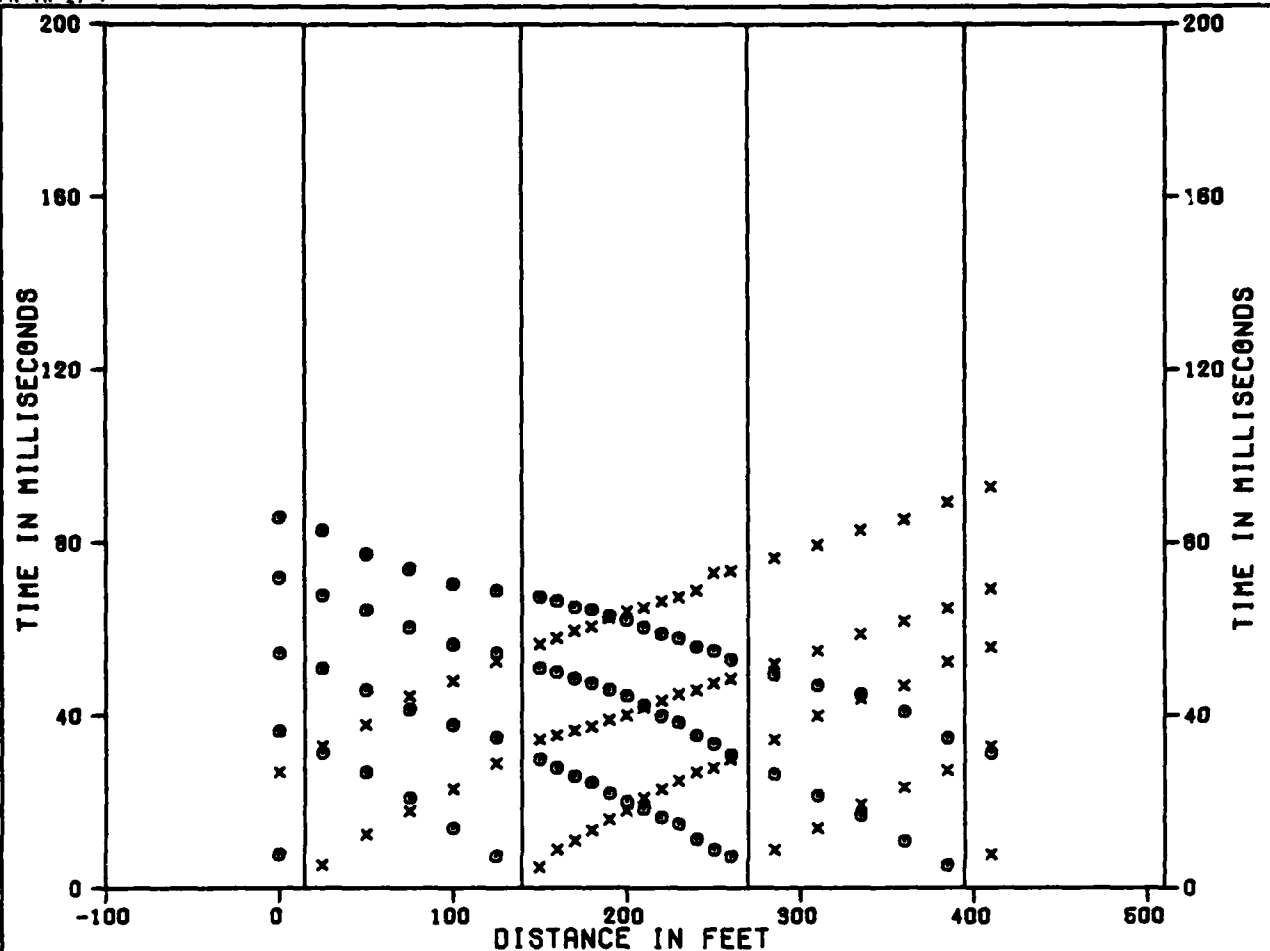
SEISMIC REFRACTION LINE WR-S-17
TIME DISTANCE DATA AND VELOCITY PROFILE
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
3-17

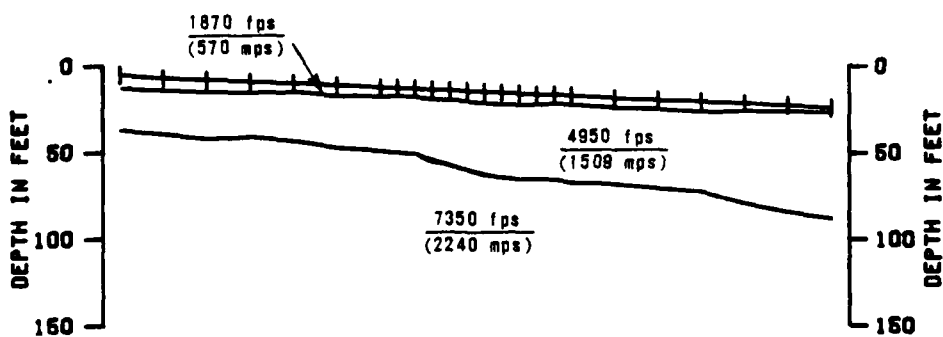
UGRO NATIONAL, INC.





SHOT F
GEOPHONES

SHOT F	0	H	I	J	K
GEOPHONES	1	7	18	24	



0 METERS 50
DISTANCE AND DEPTH

x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE WR-S-19
TIME DISTANCE DATA AND VELOCITY PROFILE
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
3-19

FUGRO NATIONAL, INC.

SECTION 4.0
ELECTRICAL RESISTIVITY DATA

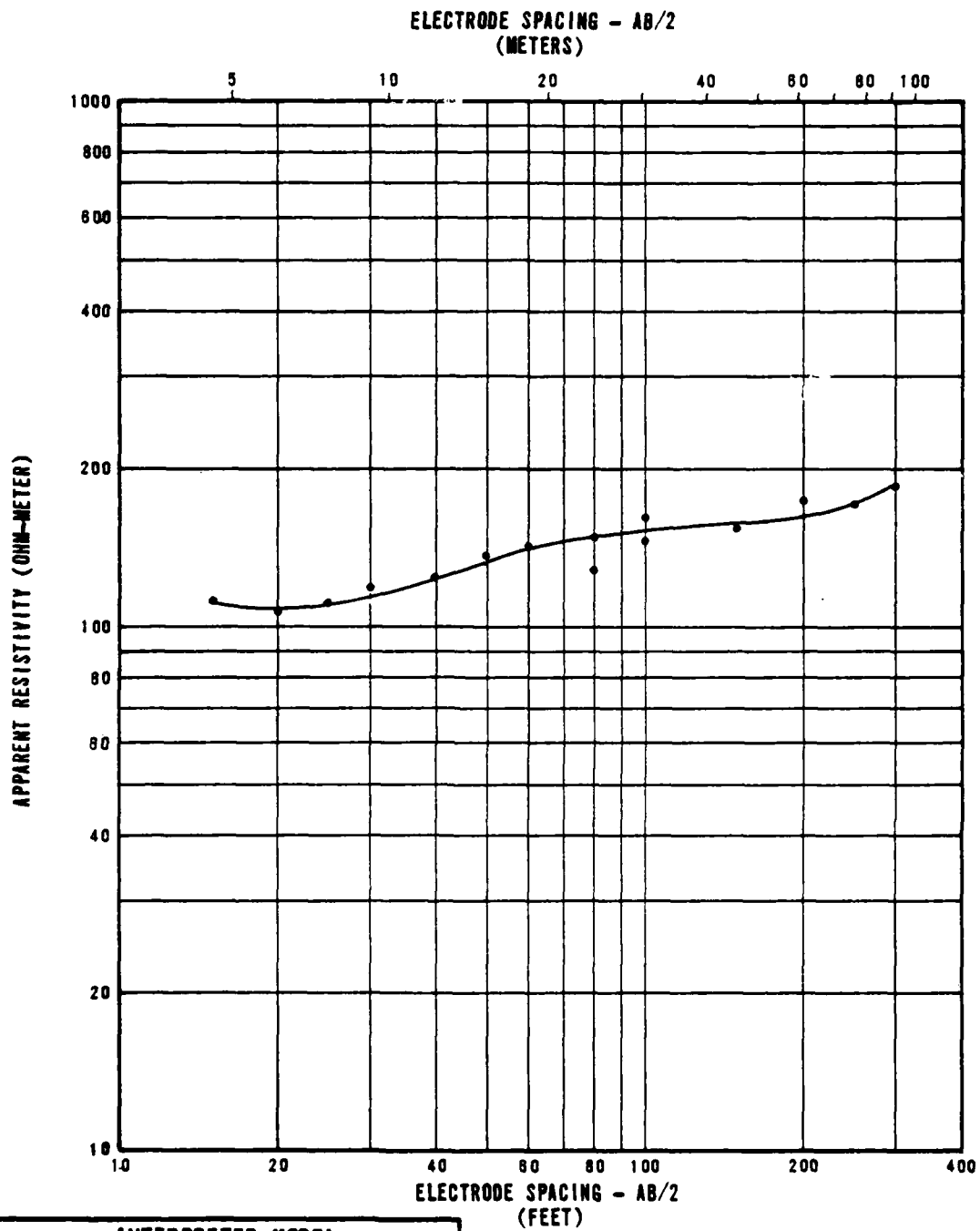


EXPLANATIONS OF ELECTRICAL RESISTIVITY DATA

Each figure in this section presents the data obtained from a resistivity sounding and a tabulated model of resistivity layers that would produce a curve similar to the observed curve.

The upper portion of the figures is a graph in which measured apparent resistivity values in ohm-meters are plotted versus one-half the distance between the current electrodes.

The interpreted model tabulated at the bottom of the page shows a combination of true resistivity layers and thicknesses obtained by matching theoretical curves to the field curve.



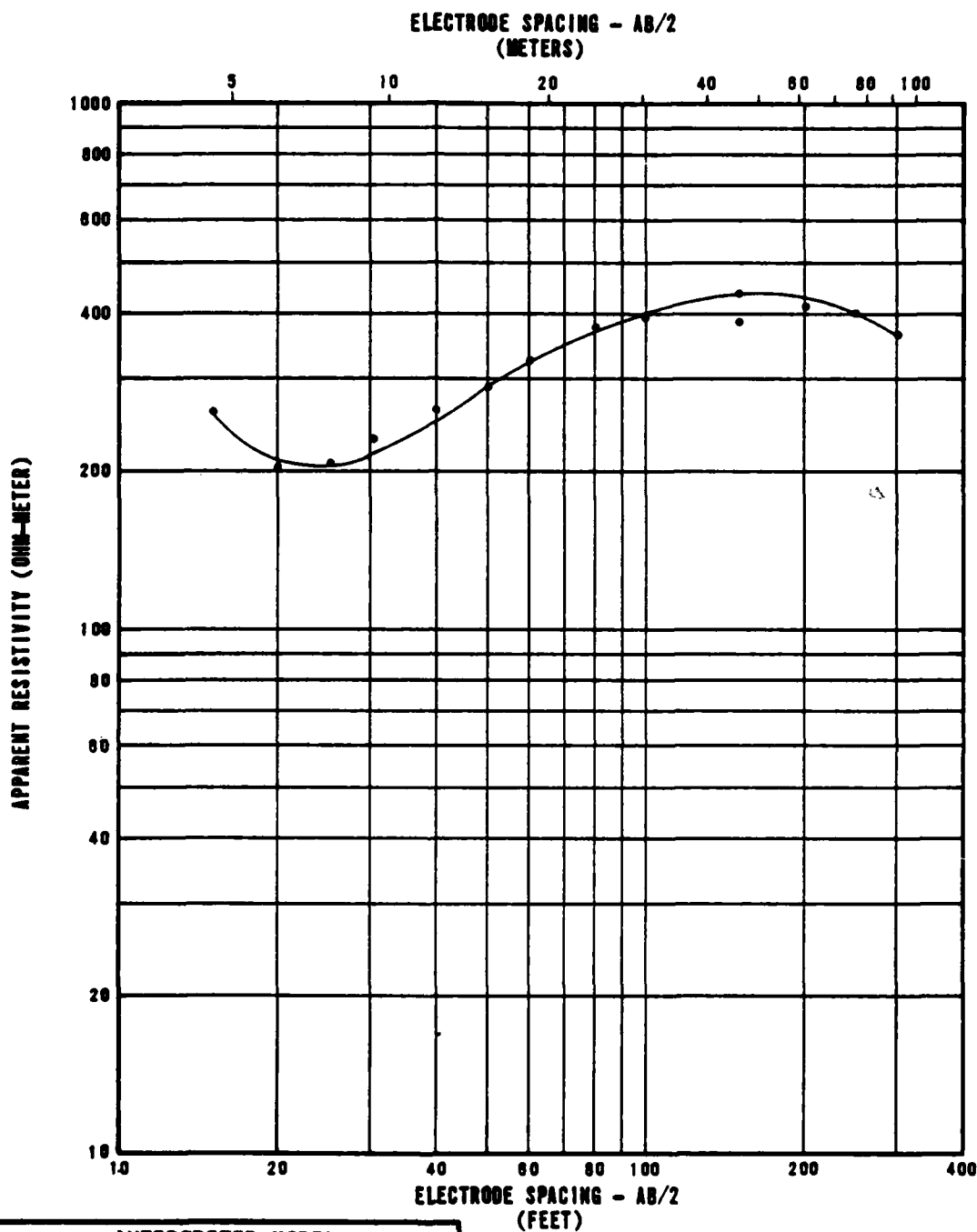
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	100
21	8	210
67	20	100
184	58	1700

RESISTIVITY SOUNDING WR-R-1
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-1

FUGRO NATIONAL, INC.



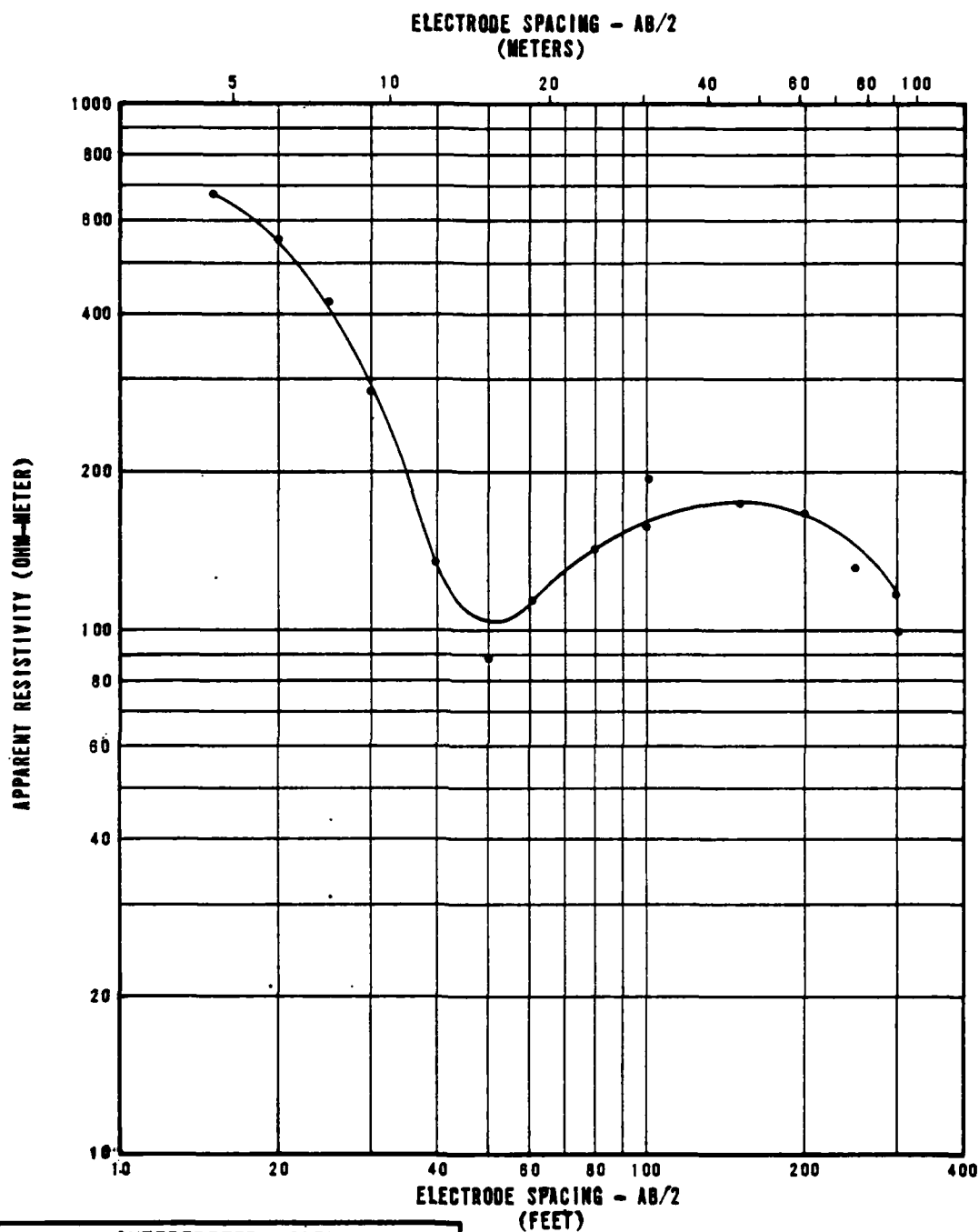
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	400
5	2	170
28	8	2490
37	11	420
122	37	170

RESISTIVITY SOUNDING WR-R-2
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
4-2

FUGRO NATIONAL INC.



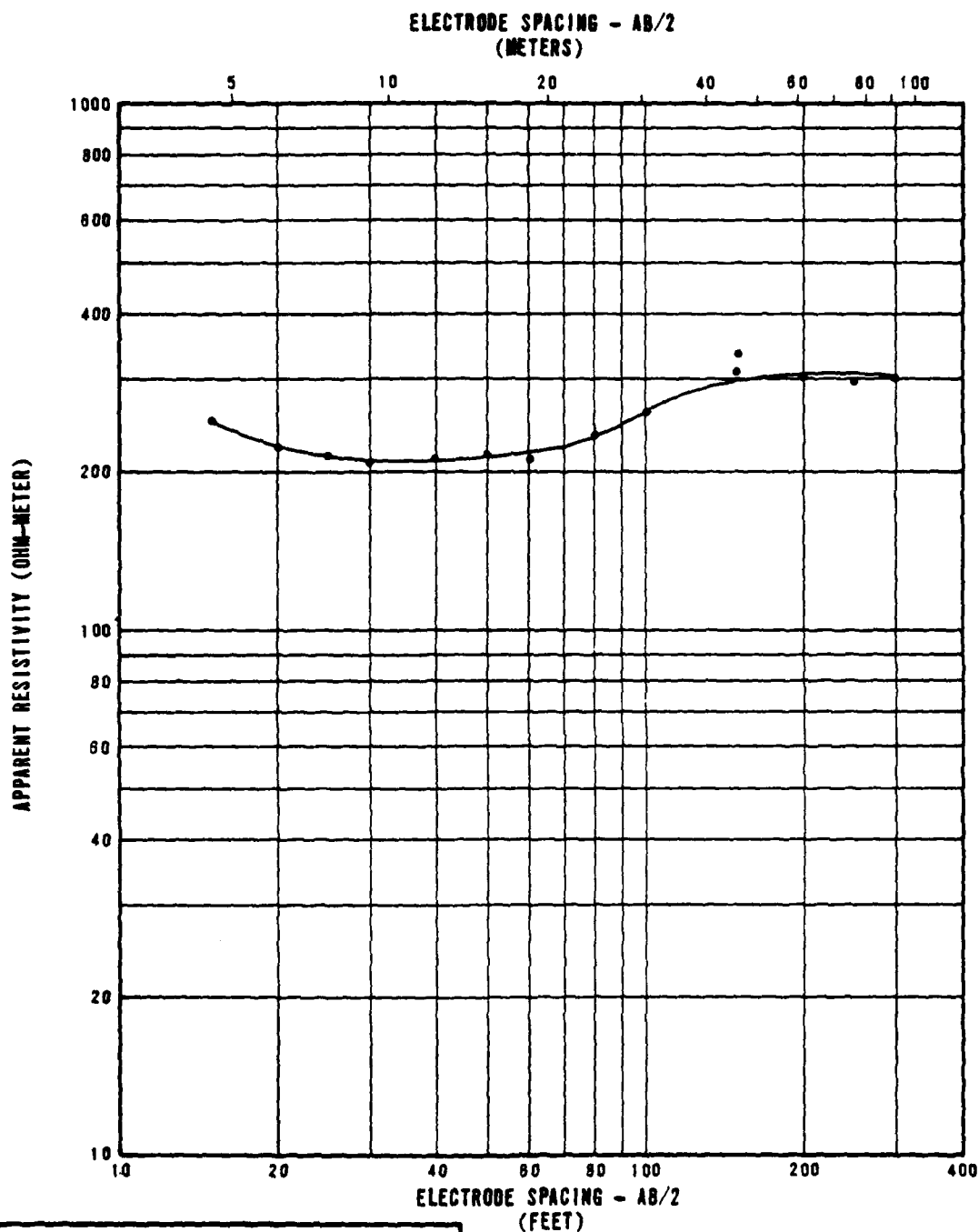
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	870
13	4	170
19	6	35
30	9	210
140	43	50

RESISTIVITY SOUNDING WR-R-3
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMS0

FIGURE
4-3

FUGRO NATIONAL, INC.

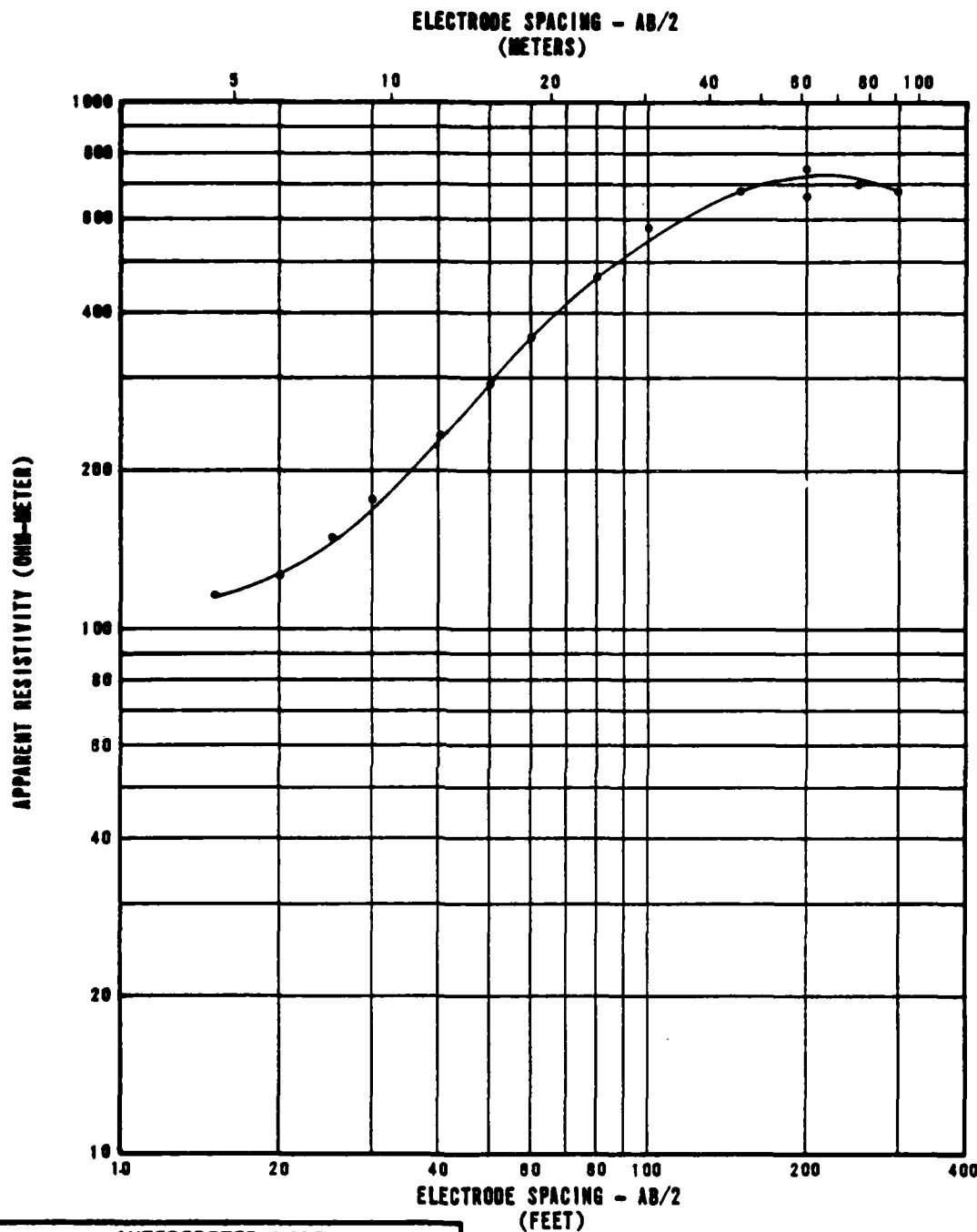


INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	300
7	2	180
38	12	380
189	58	220

RESISTIVITY SOUNDING WR-R-4
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE - SAMS0	FIGURE 4-4
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FUGRO NATIONAL, INC.



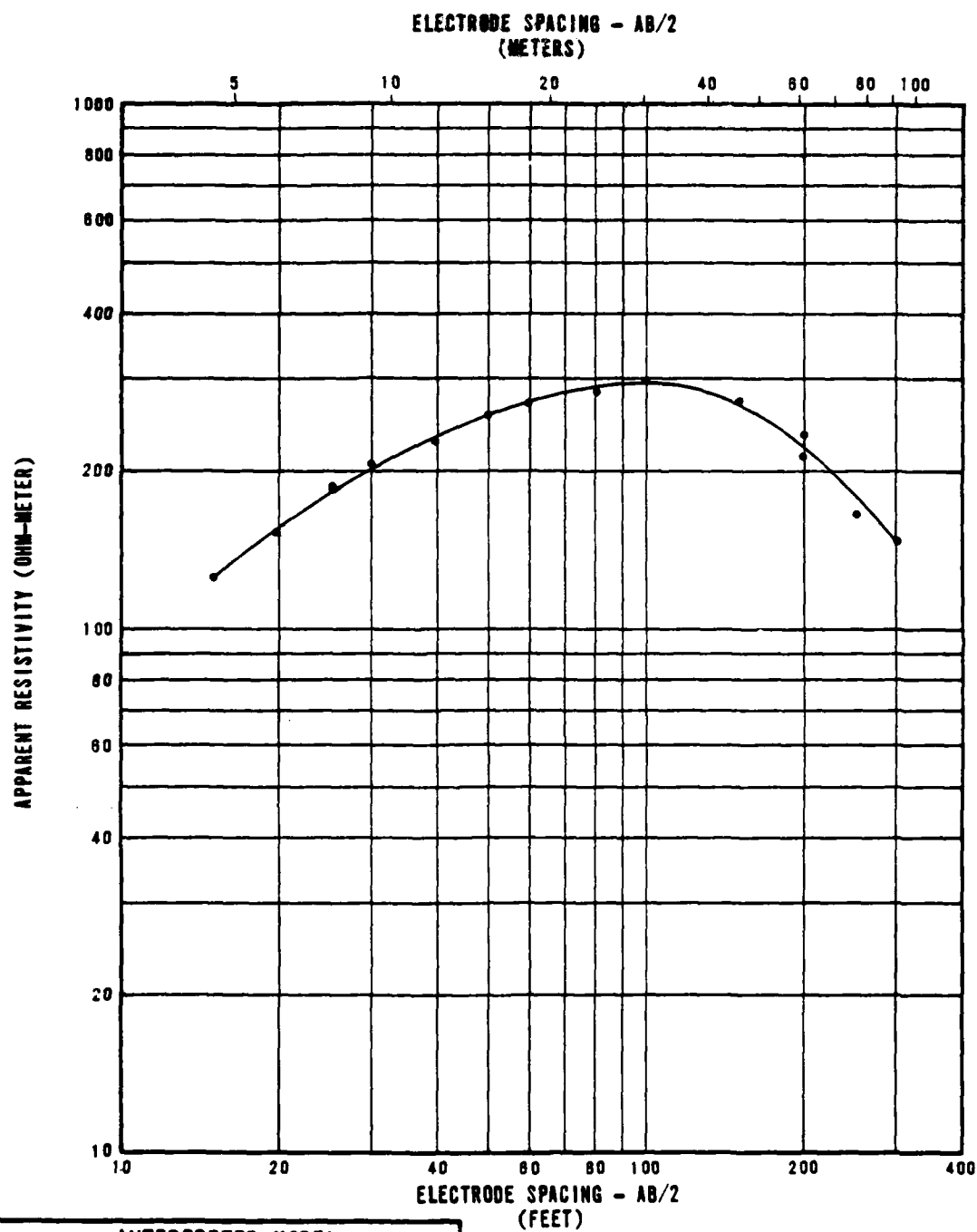
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	90
17	5	4750
42	13	680

RESISTIVITY SOUNDING WR-R-5
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-5

FURRO NATIONAL, INC.



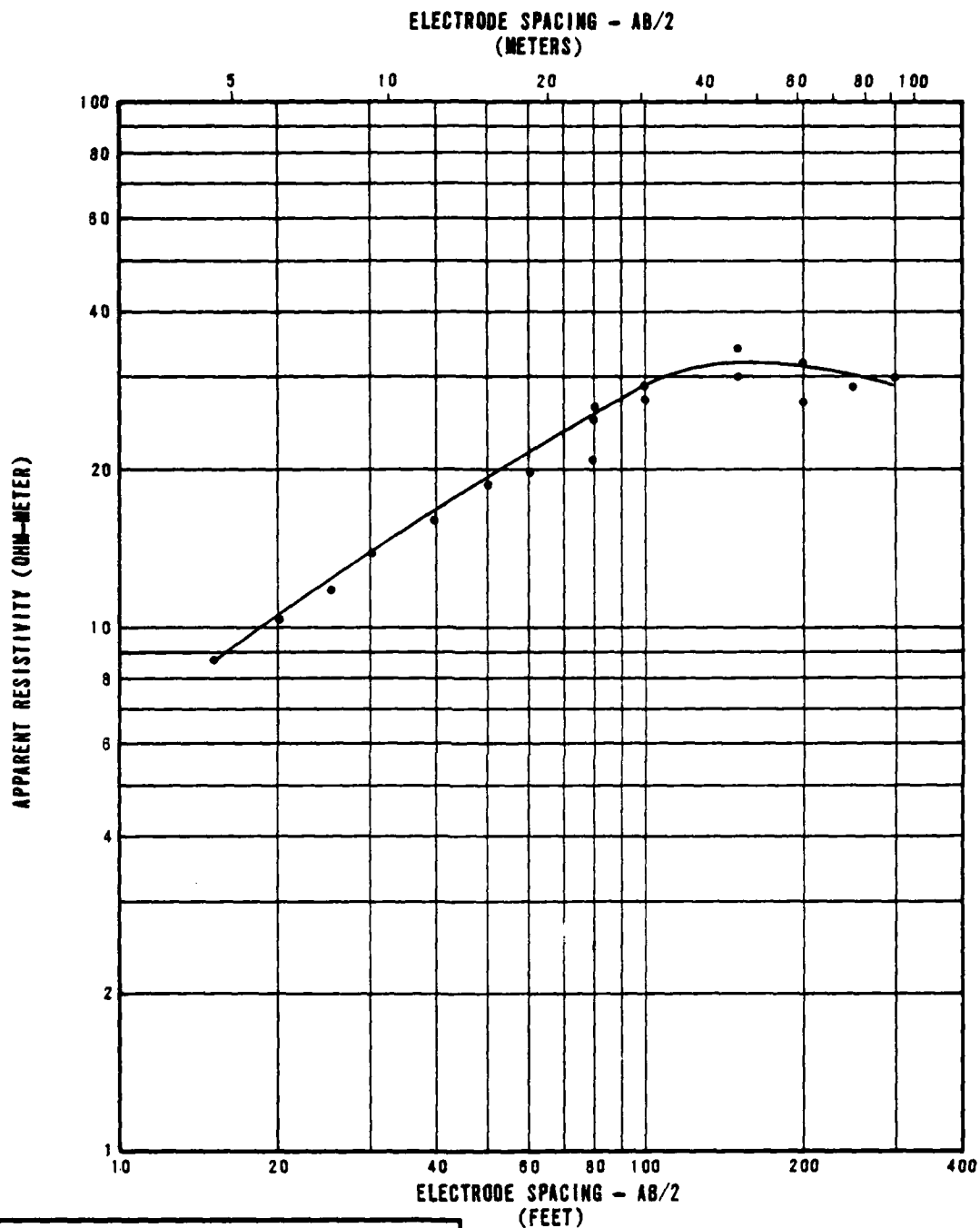
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	90
7	2	380
101	31	90
187	51	35

RESISTIVITY SOUNDING WR-R-6
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMS0

FIGURE
4-6

FUGRO NATIONAL, INC.

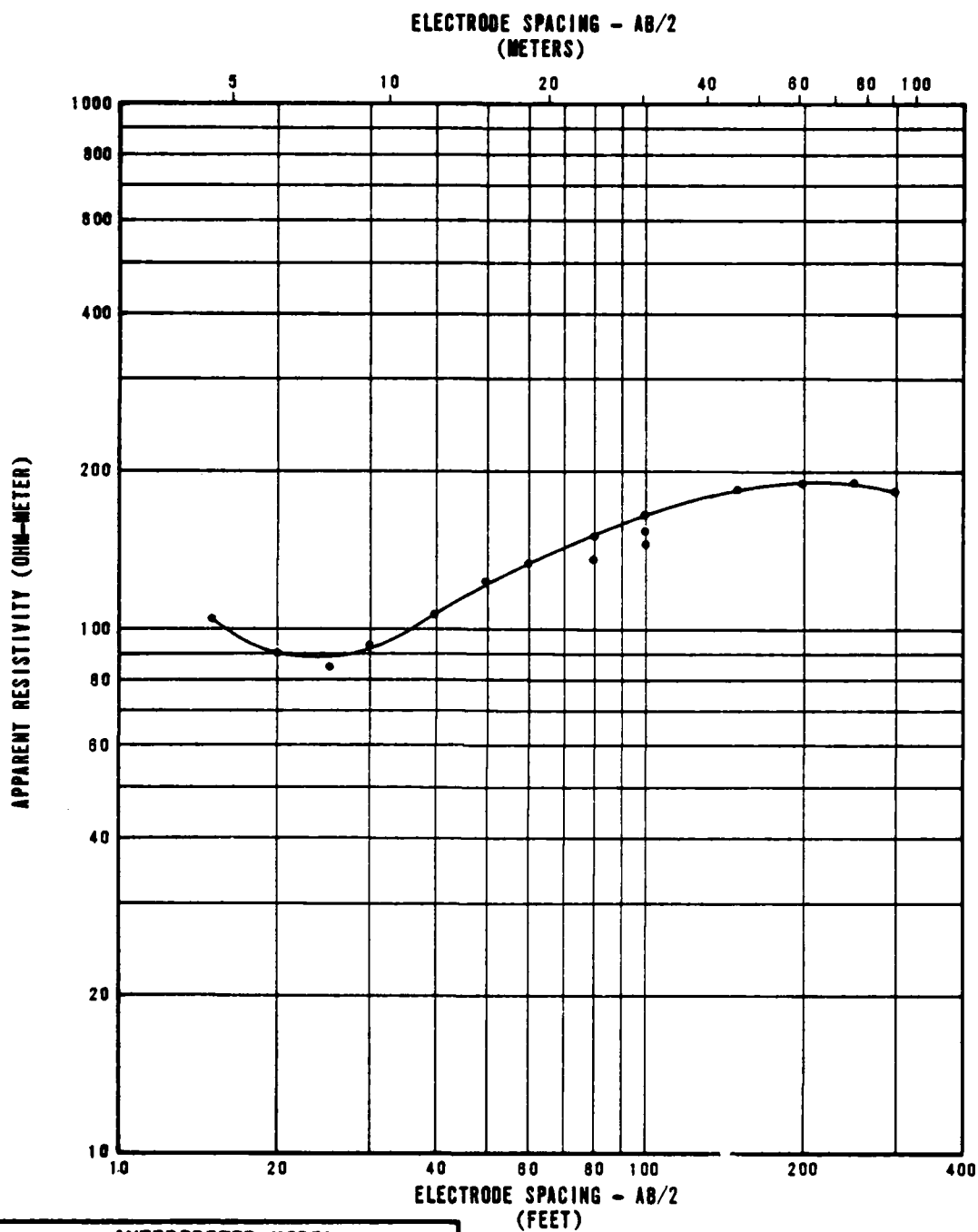


INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	8
9	3	30
25	8	60
88	20	30
188	51	15

**RESISTIVITY SOUNDING WR-R-7
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA**

MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE - SAMSQ	FIGURE 4-7
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FUGRO NATIONAL, INC.



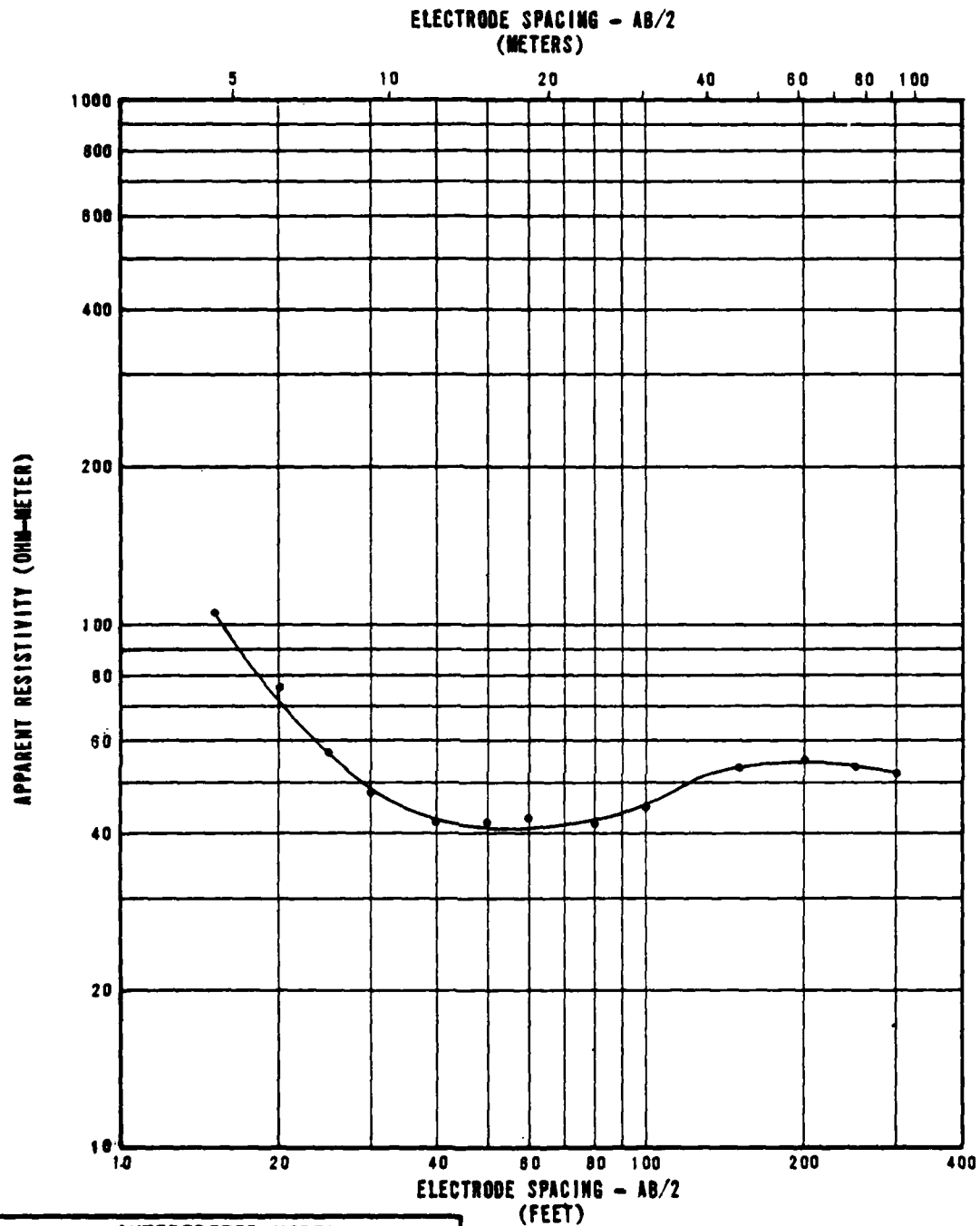
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	180
8	2	70
28	8	380
62	19	170
205	62	110

RESISTIVITY SOUNDING WR-R-8
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-8

GUGRO NATIONAL, INC.



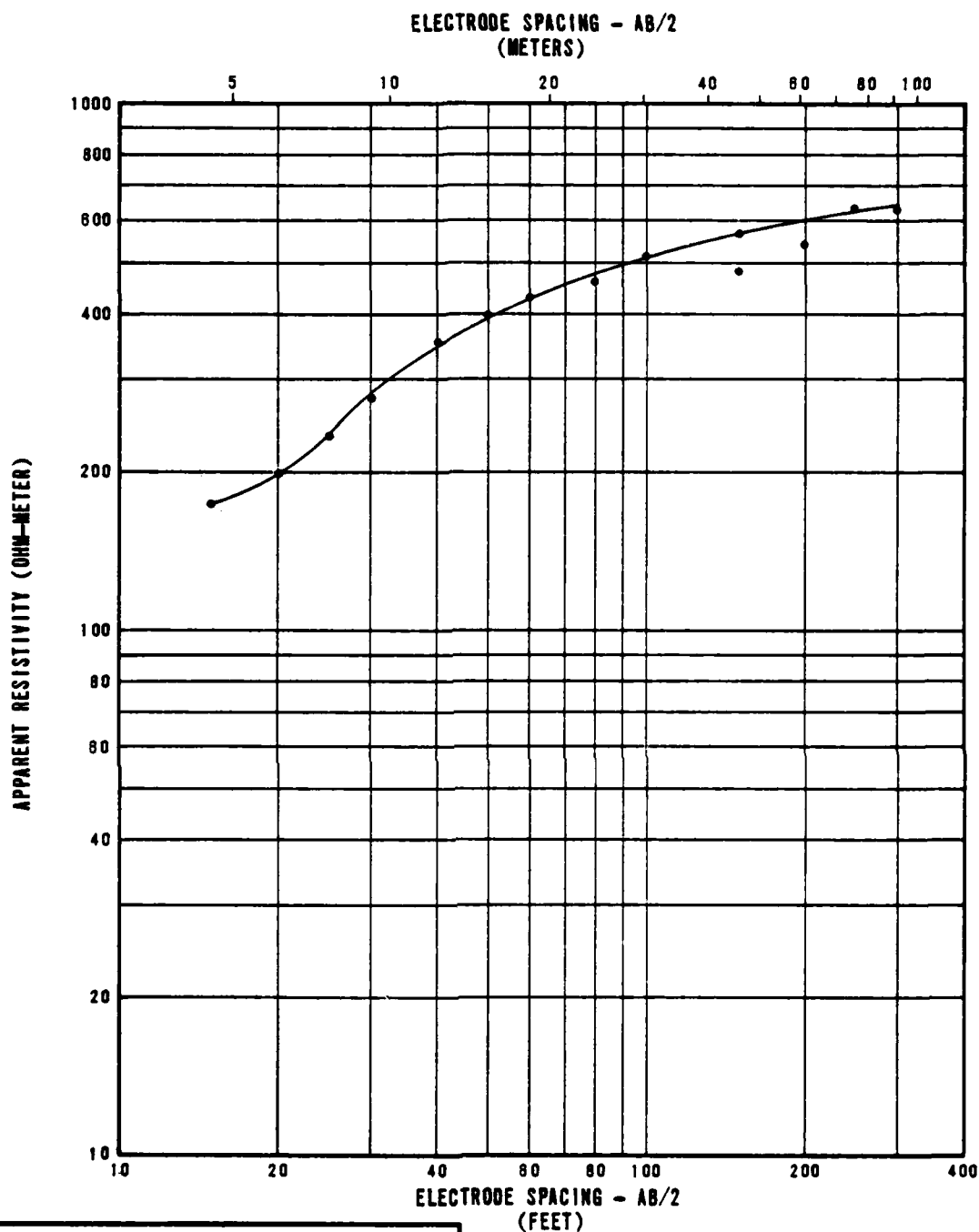
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	1940
7	2	370
58	18	790
188	51	320

RESISTIVITY SOUNDING WR-R-9
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSC

FIGURE
4-9

FURRO NATIONAL, INC.

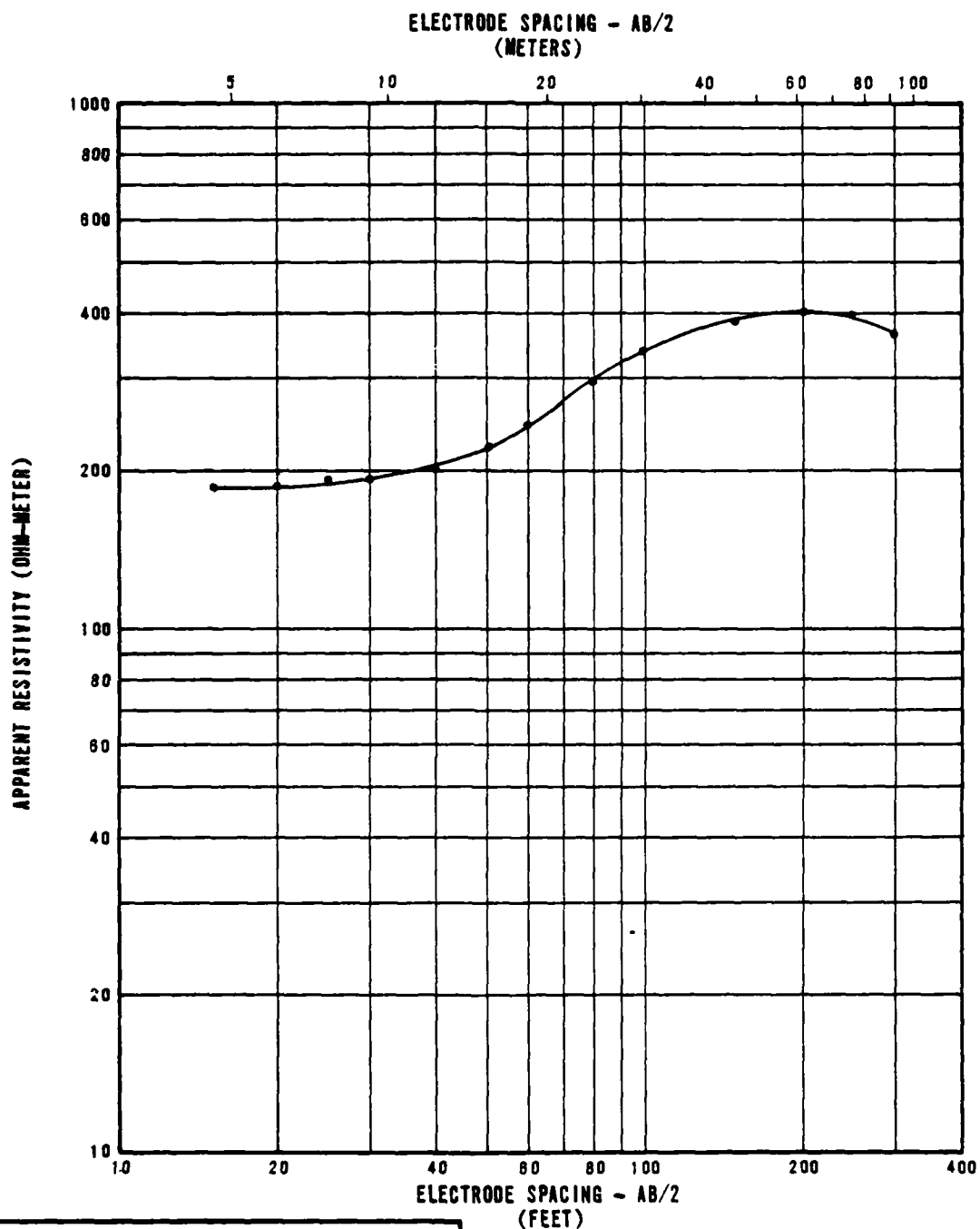


INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	150
11	3	870

RESISTIVITY SOUNDING WR-R-10
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE - SAMS0	FIGURE 4-10
--	----------------

FUGRO NATIONAL, INC.



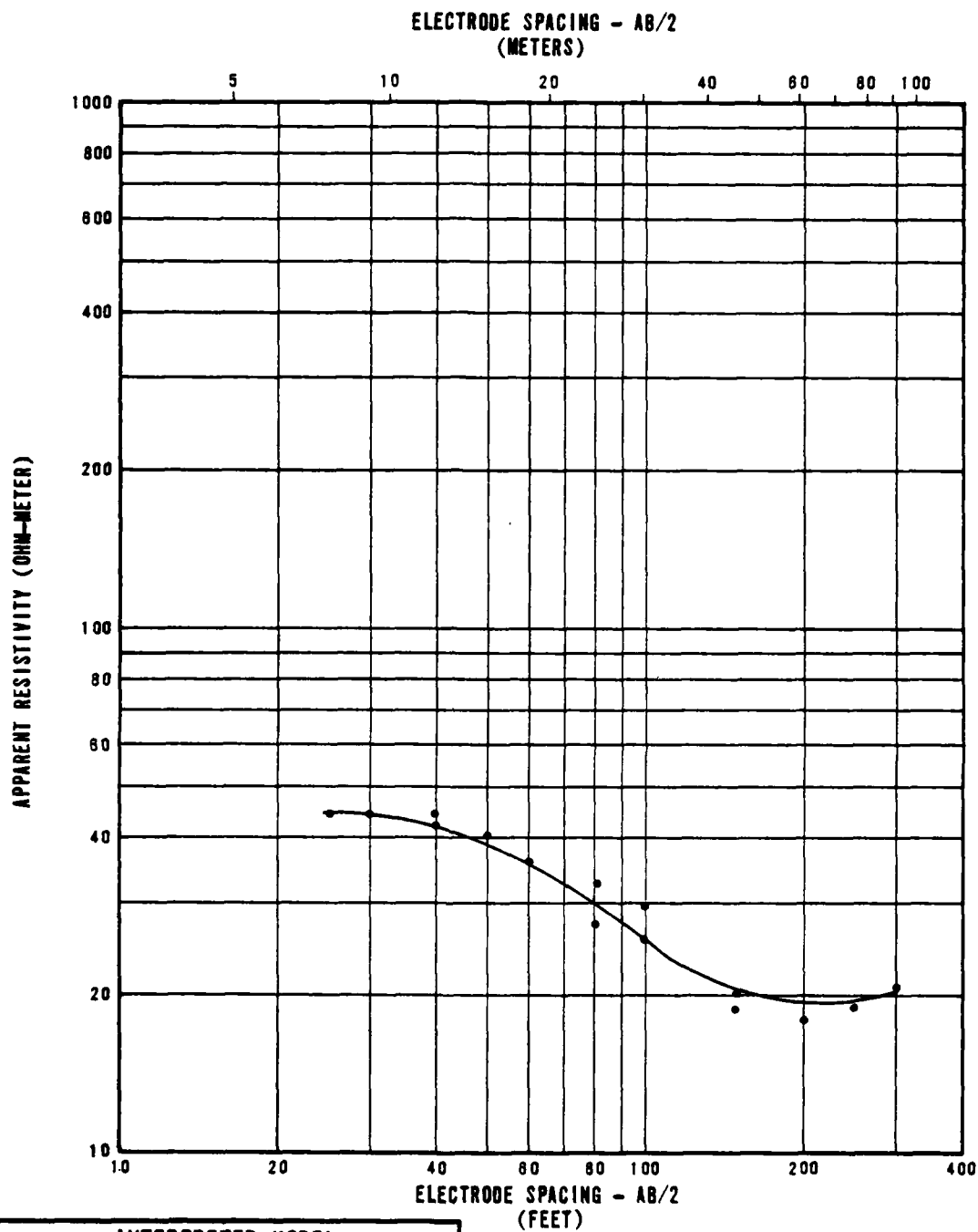
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	190
33	10	590
190	58	75

RESISTIVITY SOUNDING WR-R-11
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-11

FUGRO NATIONAL, INC.



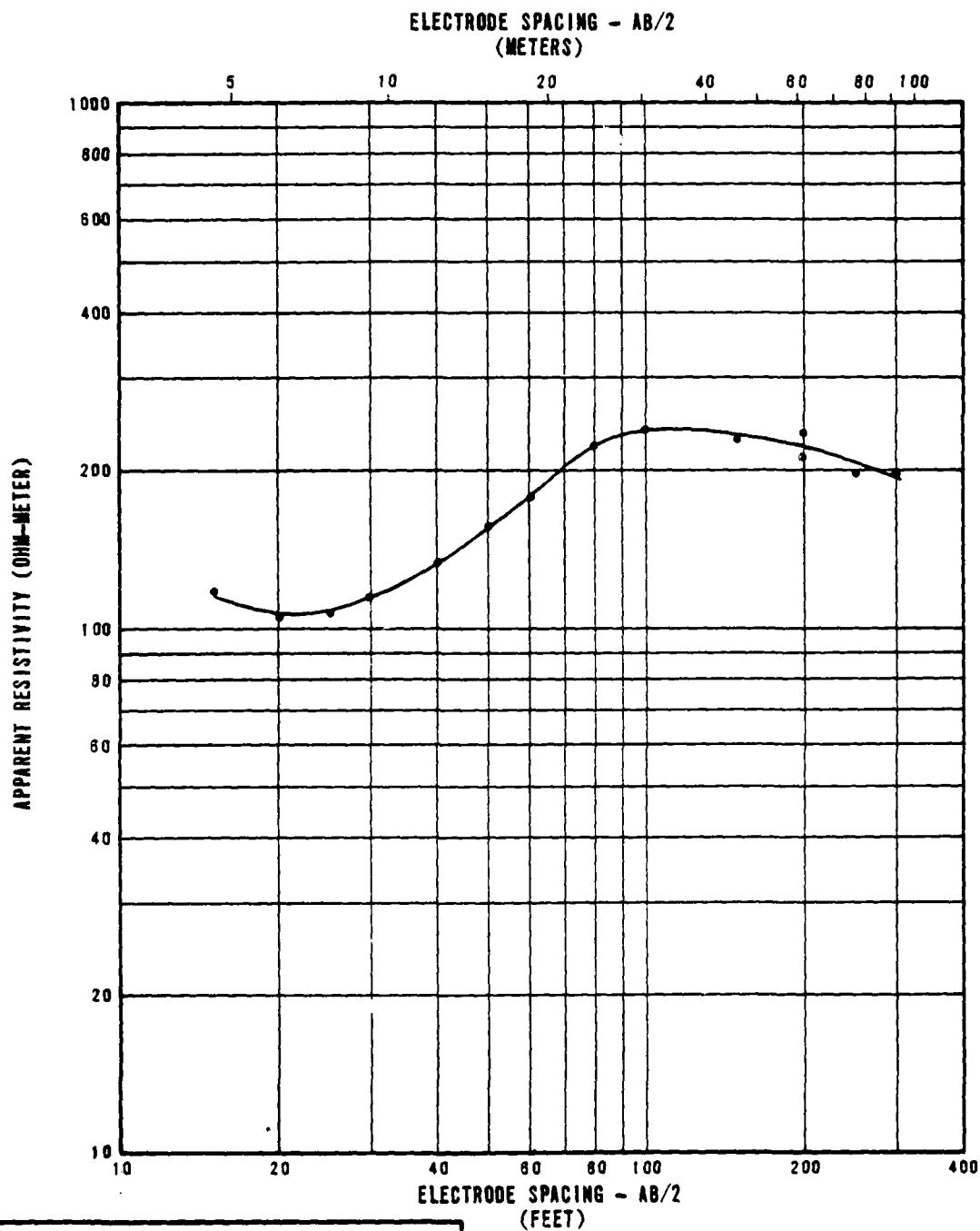
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	45
38	11	14
144	44	35

RESISTIVITY SOUNDING WR-R-12
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-12

FUGRO NATIONAL INC.



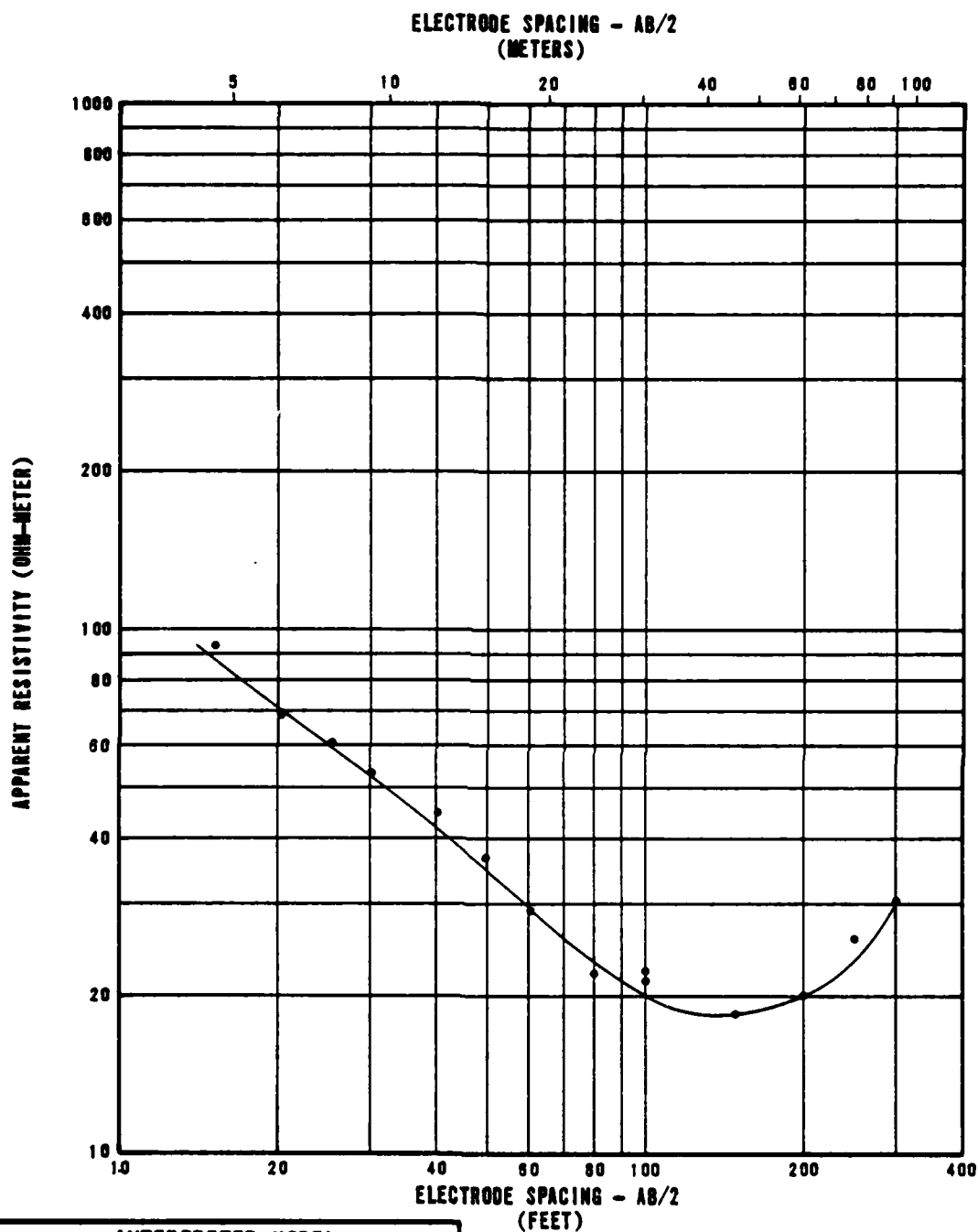
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	150
8	2	85
21	8	330
79	24	110

RESISTIVITY SOUNDING WR-R-13
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE.
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-13

FUGRO NATIONAL, INC.



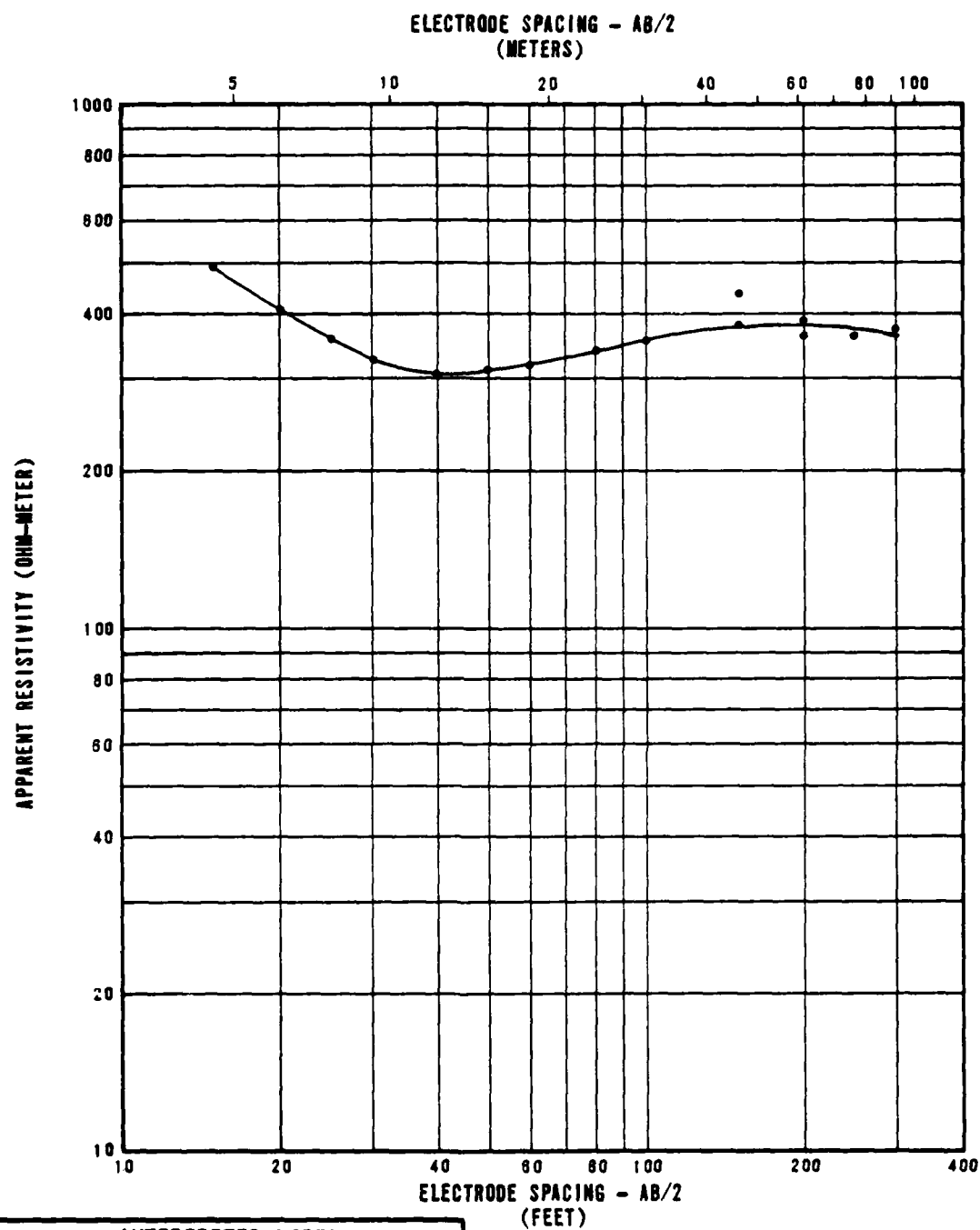
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	120
9	3	17
131	40	170
158	48	580

RESISTIVITY SOUNDING WR-R-14
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
4-14

FUGRO NATIONAL, INC.

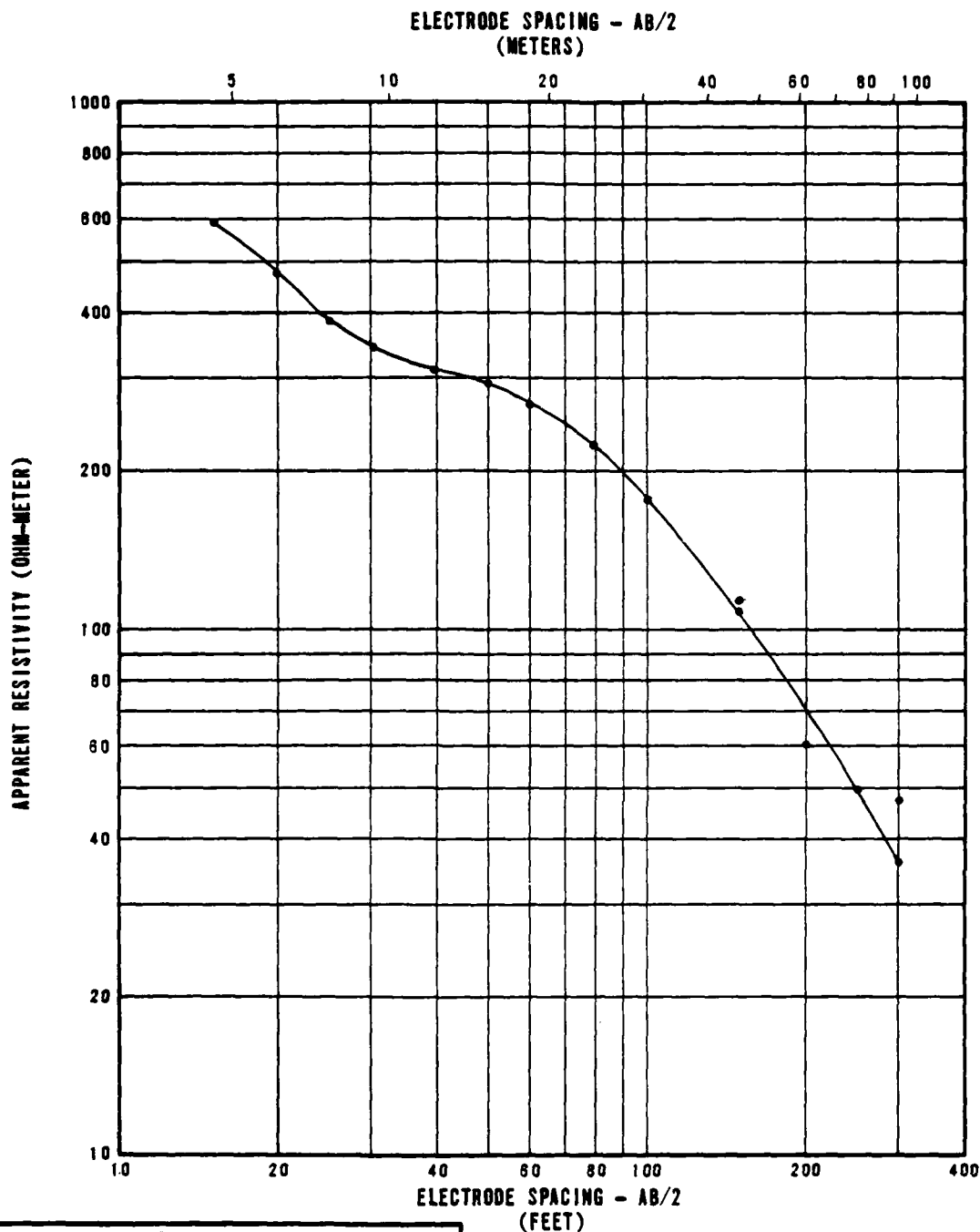


RESISTIVITY SOUNDING WR-R-15
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-15

FUGRO NATIONAL, INC.



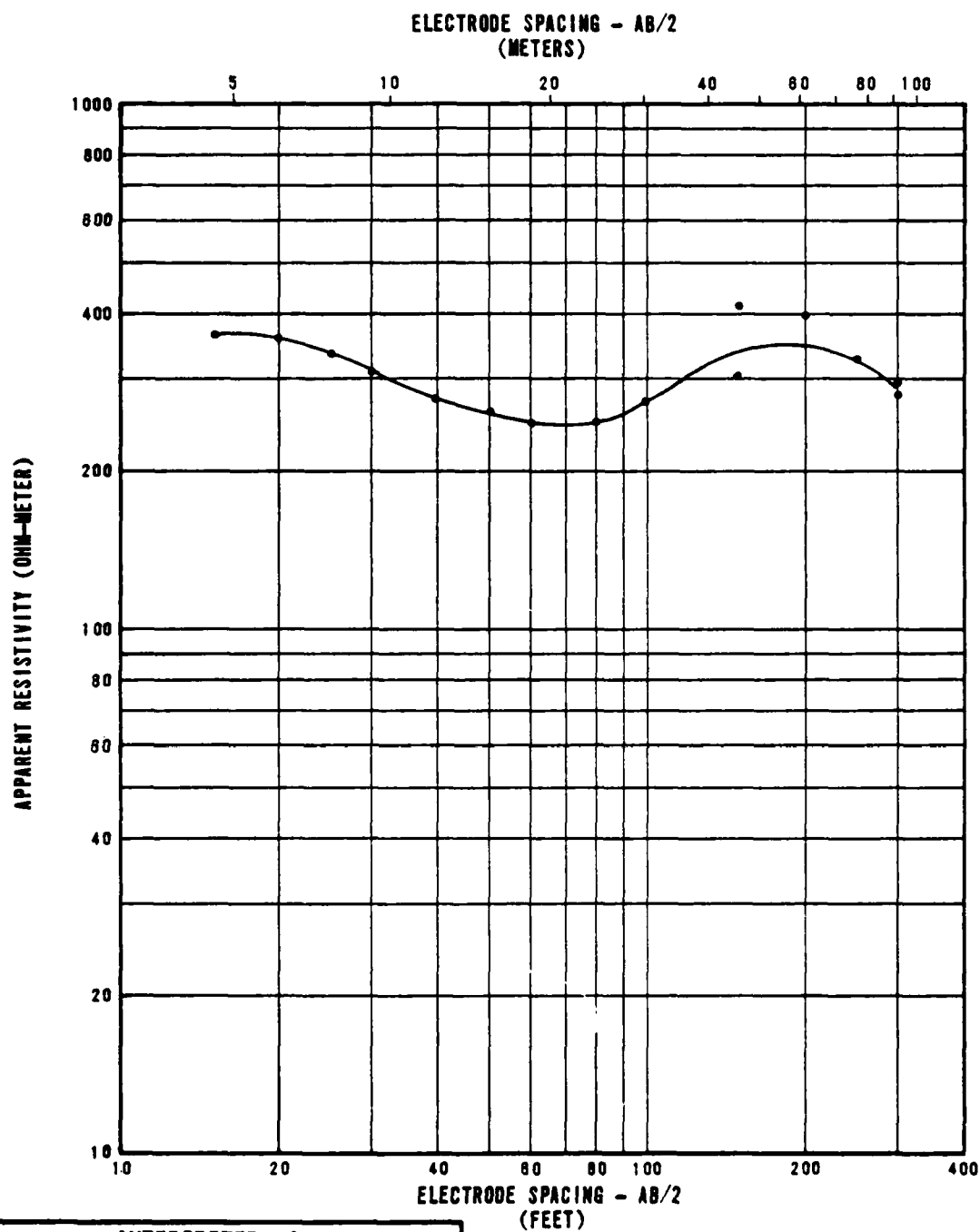
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	730
10	3	280
73	22	20

RESISTIVITY SOUNDING WR-R-16
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE.
WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-16

FUGRO NATIONAL, INC.



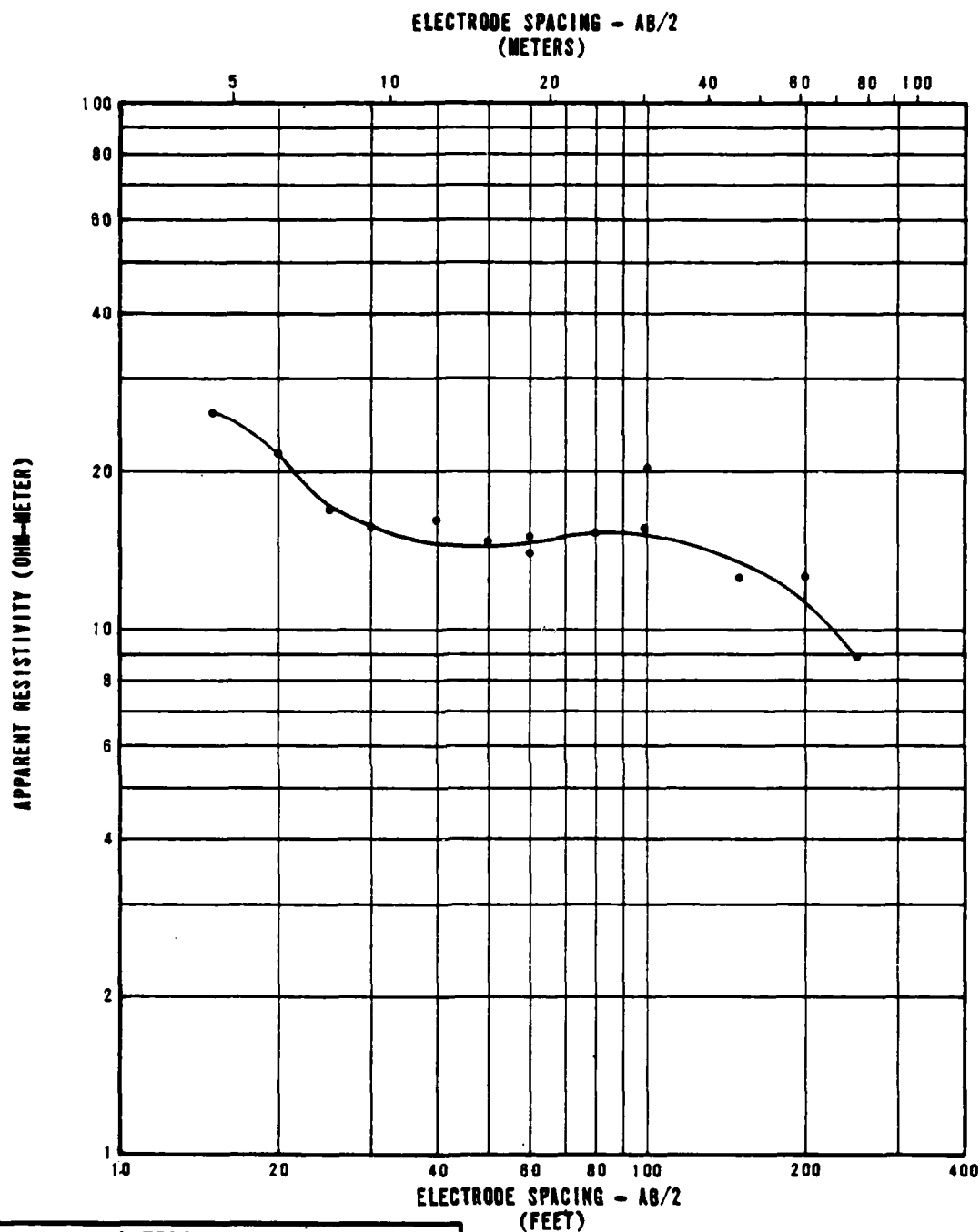
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	390
14	4	200
83	19	2570
80	24	370
158	48	80

RESISTIVITY SOUNDING WR-R-17
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

WX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMS0

FIGURE
4-17

FUGRO NATIONAL, INC.



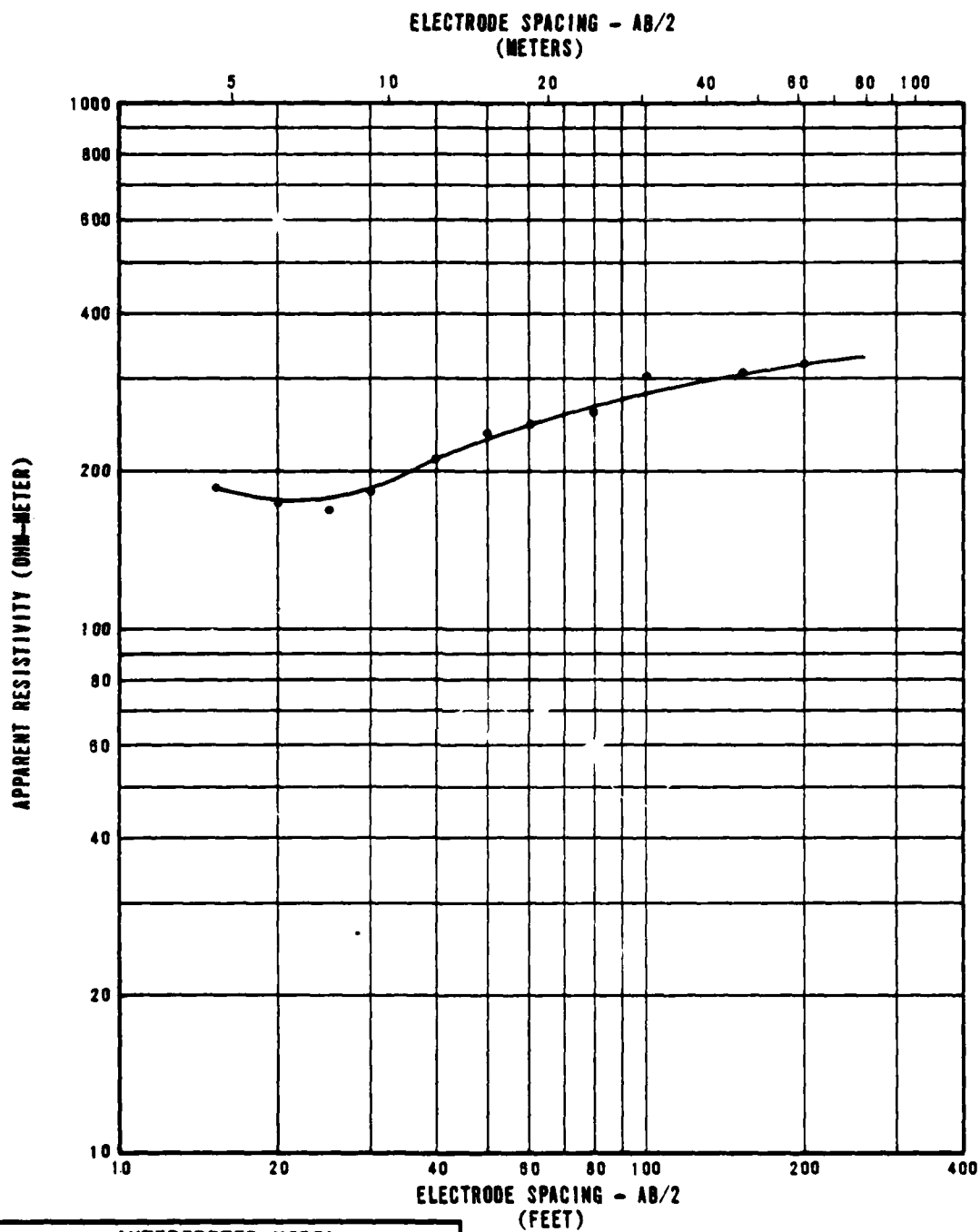
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	35
10	3	8
21	8	25
74	23	4

RESISTIVITY SOUNDING WR-R-18
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-18

FUGRO NATIONAL, INC.



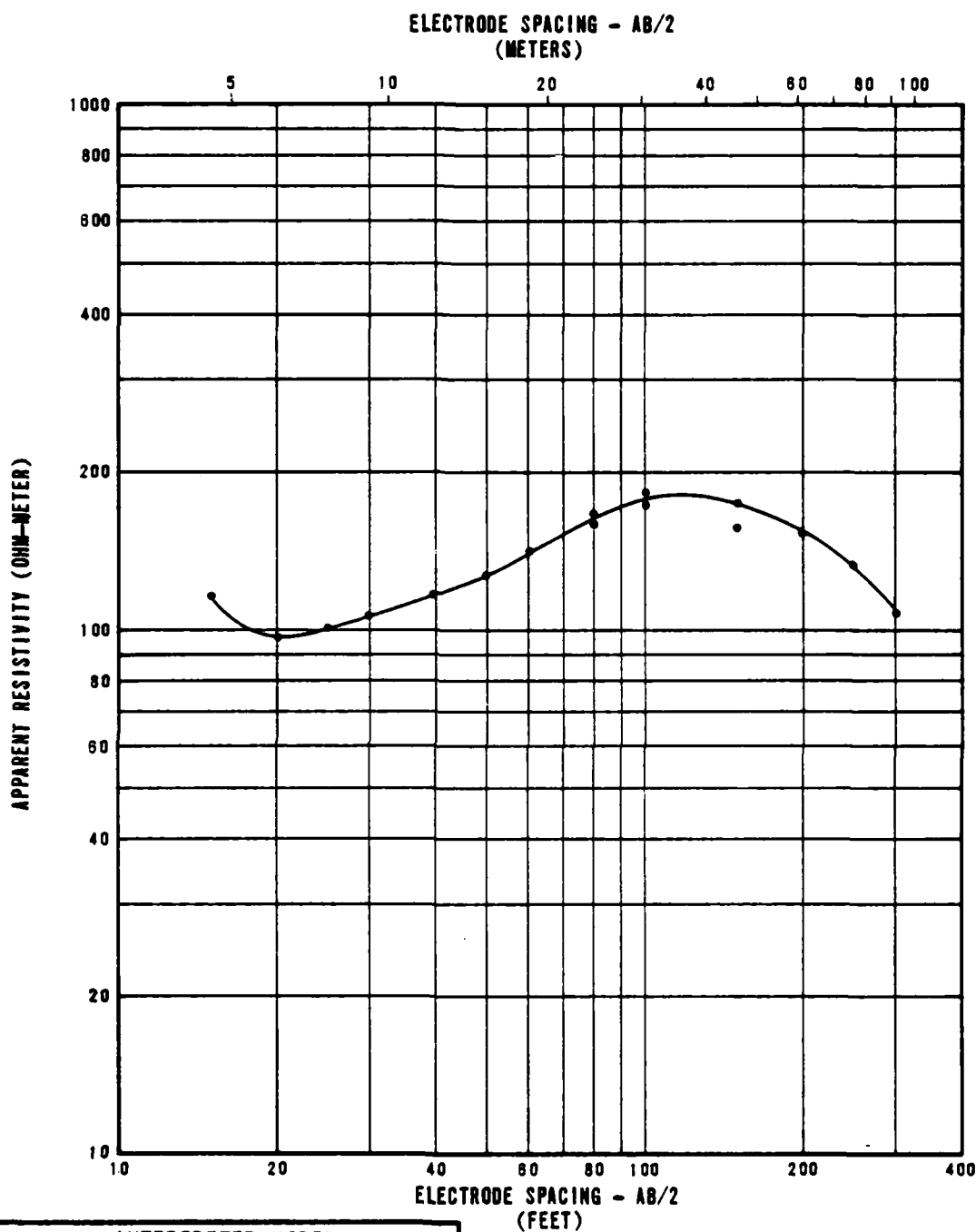
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	200
7	2	150
20	6	340

RESISTIVITY SOUNDING WR-R-19
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSQ

FIGURE
4-19

FUGRO NATIONAL, INC.



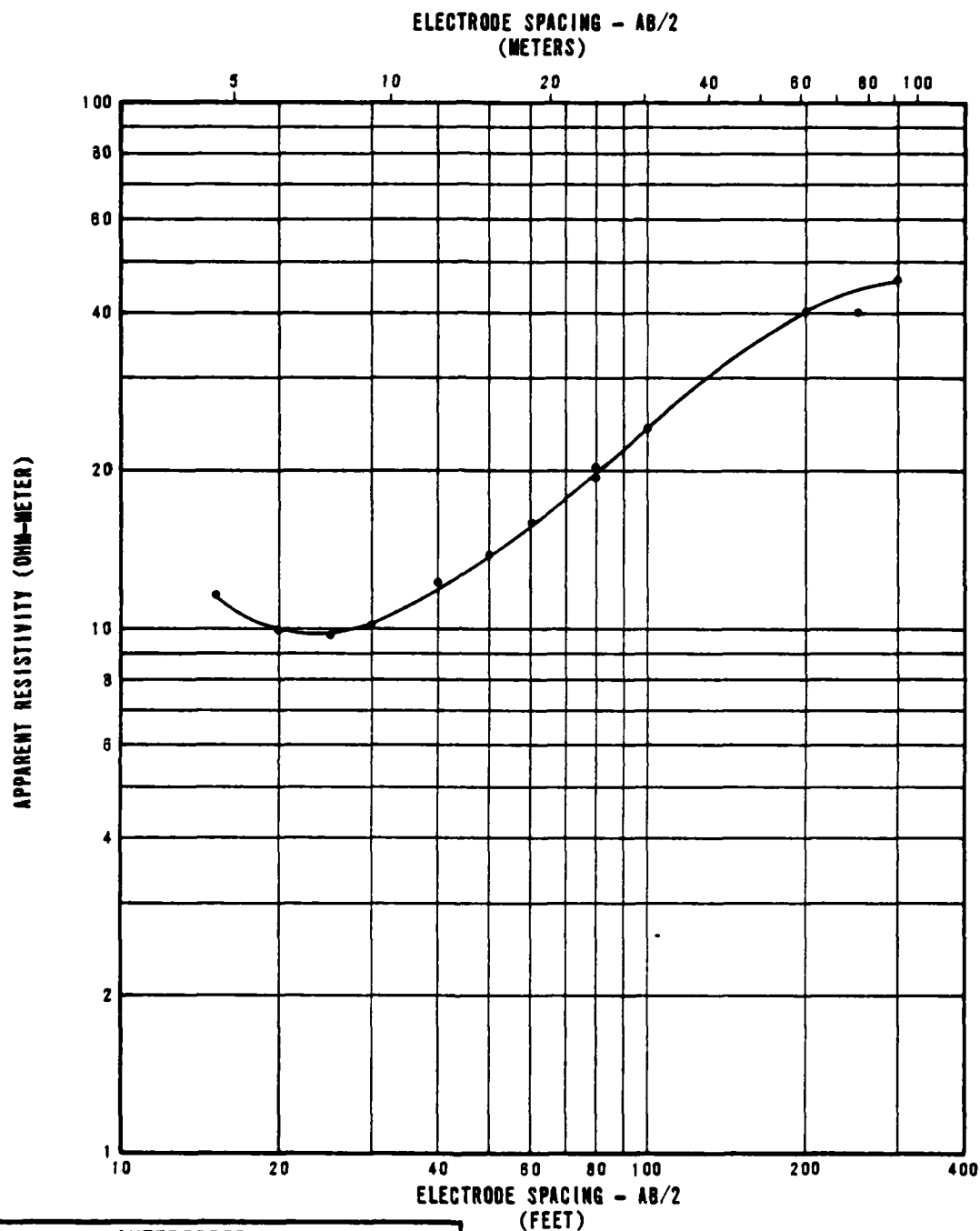
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	95
25	8	480
51	16	180
117	36	25

RESISTIVITY SOUNDING WR-R-20
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMS0

FIGURE
4-20

FUGRO NATIONAL, INC.



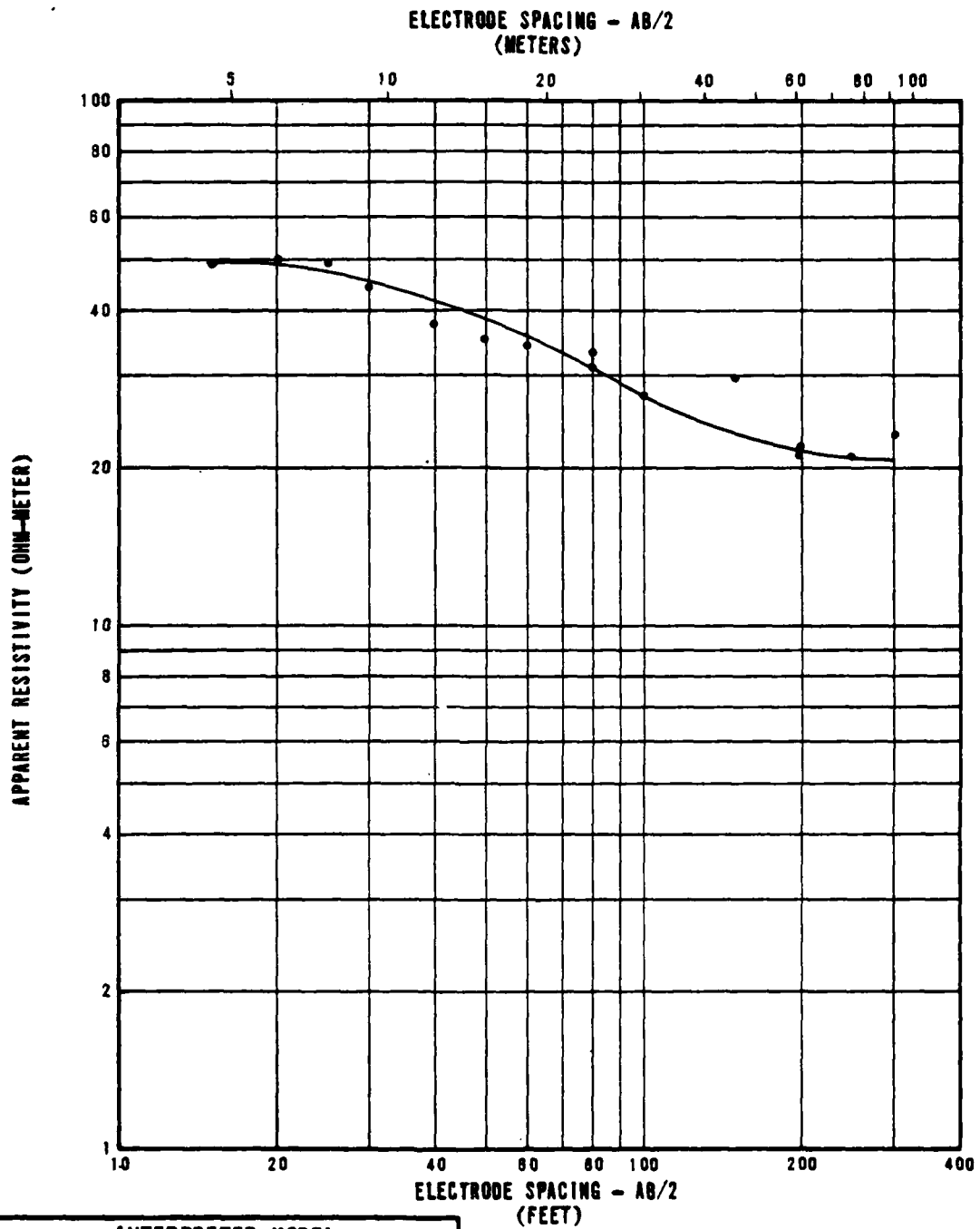
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	9
28	8	70
172	52	50

RESISTIVITY SOUNDING WR-R-21
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSQ

FIGURE
4-21

FUGRO NATIONAL, INC.



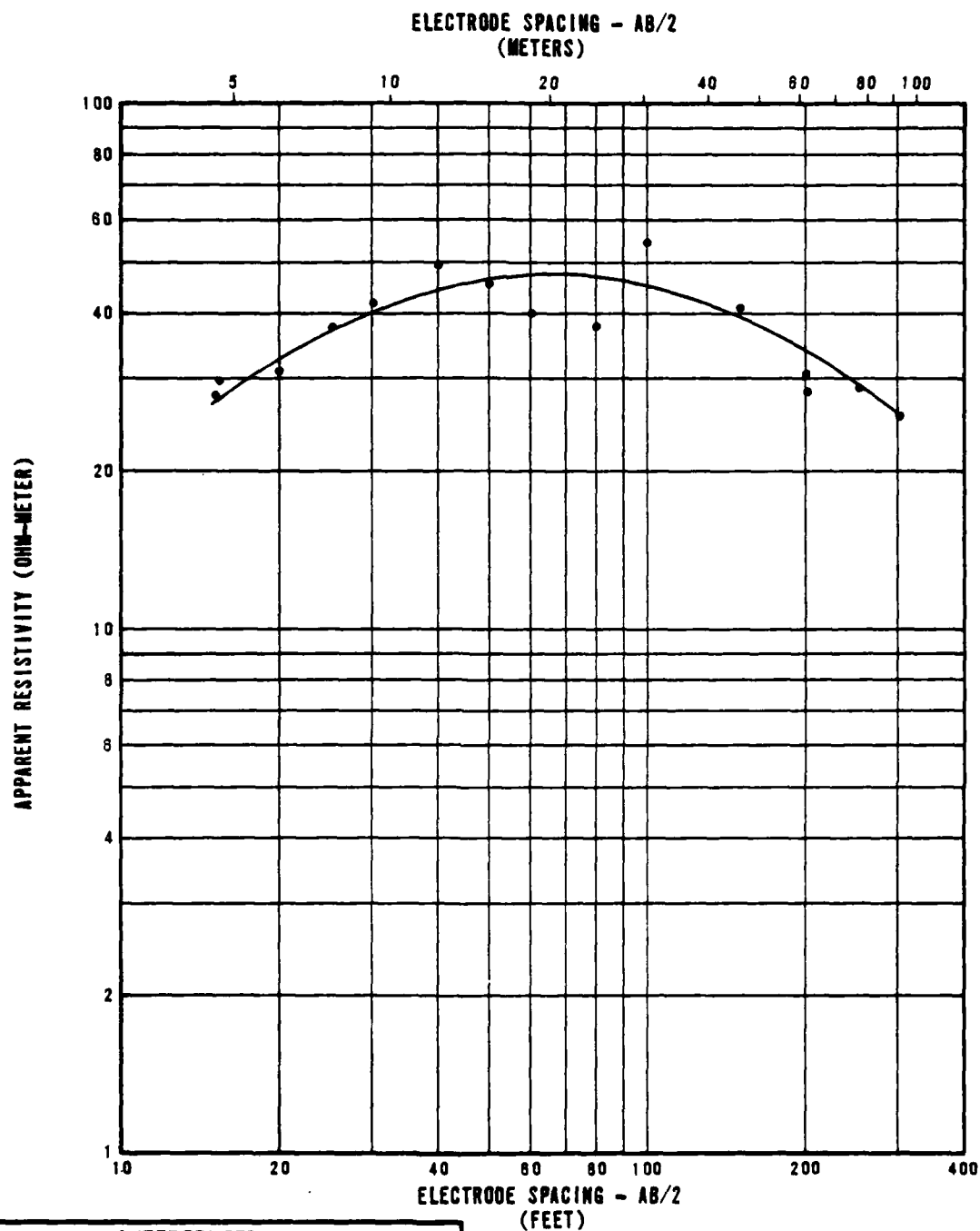
INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	50
31	9	20

RESISTIVITY SOUNDING WR-R-22
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
4-22

FUGRO NATIONAL, INC.



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	19
7	2	85
42	13	40
101	31	17

RESISTIVITY SOUNDING WR-R-23
SOUNDING CURVE AND INTERPRETATION
VERIFICATION SITE,
WHITE RIVER NORTH CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSQ

FIGURE
4-23

FUGRO NATIONAL, INC.

SECTION 5.0

GRAVITY DATA

EXPLANATIONS OF GRAVITY DATA

Gravity data were not available in time (prior to June 1979) for incorporation into this report. A supplemental report containing gravity data and results will be issued at a later date.

SECTION 6.0

BORING LOGS

EXPLANATIONS OF BORING, TRENCH, AND TEST PIT LOGS

All data from borings, trenches, and test pits are presented on standard Fugro National logs in Sections 6.0 and 7.0. The following explanations are provided as a key to the logs.

- A. Designations - Borings, trenches, and test pits are identified as follows:

WW-B-1

WW - abbreviation for the site (e.g., WW-Whirlwind)

B - abbreviation for activity (e.g., B-boring, T-trench, P-test pit)

1 - number of activity

- B. Sample Type - Different sampling techniques were used and the symbols are explained at the bottom of the boring logs. For details of sampling techniques, see Section A5.0 of Appendix in Volume I. Horizontal lines, to scale, indicate the depth where sampling was attempted.
- C. Percent Recovery - The numbers shown represent the ratio (in percent) of the soil sample recovered in the sampler to the full penetration of the sampler.
- D. N Value - Corresponds to standard penetration resistance, which is number of blows required to drive a standard split-spoon sampler for the second and third of three 6-inch (15 cm) increments with a 140-pound (63.5 kg) hammer falling 30 inches (76 cm) (ASTM D 1586-67).
- E. Depth - Corresponds to depth below ground surface in meters and feet.
- F. Lithology - Graphic representation of the soil and rock types.

- G. USCS - Unified Soil Classification System (see Table 6-1 for complete details) symbols.
- H. Soil Description - Except in cases where samples were classified based on laboratory test data, the descriptions are based on visual classification. The procedures outlined in ASTM D 2487-69, Classification of Soils for Engineering Purposes, and D 2488-69, Description of Soils (Visual-Manual Procedure) were followed. Solid lines across the column indicate known change in strata at the depth shown.

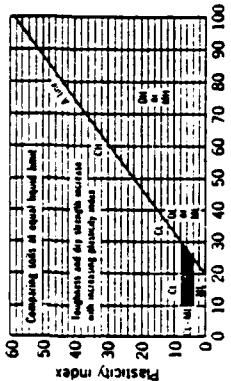
Definitions of some of the terms and criteria to describe soils and conditions encountered during the exploration follow.

Gradation : A coarse-grained soil is well graded if it has a wide range in grain size and substantial amounts of most intermediate particle sizes.

Poorly graded indicates that the soil consists predominantly of one size (uniformly graded) or has a wide range of sizes with some intermediate sizes obviously missing (gap-graded).

Moisture :	Dry	- no feel of moisture
	Slightly Moist	- much less than normal moisture
	Moist	- normal moisture for soil
	Very Moist	- much greater than normal moisture
	Wet	- for soils below the water table (if known)

Field Identification Procedures (Excluding particles larger than 3 in. and minus fractions on estimated weights)				Group Symbols		Typical Names		Information Required for Describing Soils		Laboratory Classification Criteria	
Coarse-grained soils More than half of coarse fraction is smaller than No. 200 sieve size	Gravel More than half of coarse fraction is smaller than No. 4 sieve size	Clean sands (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	GW	Well graded gravel, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, dry hardness of the coarse fraction; and other pertinent information, and symbols in parentheses	Determine percentages of gravel and sand from grain size curve	Not meeting all gradation requirements for GW	D ₅₀ Greater than 4 C _u = $\frac{D_{60}}{D_{10}}$ Between 1 and 3	D ₅₀ Greater than 4 C _u = $\frac{D_{60}}{D_{10}}$ Between 1 and 3	Not meeting all gradation requirements for GW
Fine-grained soils More than half of material is smaller than No. 200 sieve size	Silty sand and clay Liquid limit less than 50	Sands with fines (more than 5% fines)	Predominantly one size or a range of sizes with some intermediate sizes missing	SP	Poorly graded sand, gravelly sand, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, dry hardness of the coarse fraction; and other pertinent information, and symbols in parentheses	Determine percentages of gravel and sand from grain size curve	Not meeting all gradation requirements for SP	D ₅₀ Greater than 4 C _u = $\frac{D_{60}}{D_{10}}$ Between 1 and 3	D ₅₀ Greater than 4 C _u = $\frac{D_{60}}{D_{10}}$ Between 1 and 3	Not meeting all gradation requirements for SP
Highly Organic Soils	Peat and other highly organic soils	Peat and other highly organic soils	Peat and other highly organic soils	Pt	Peat and other highly organic soils	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, dry hardness of the coarse fraction; and other pertinent information, and symbols in parentheses	Determine percentages of gravel and sand from grain size curve	Not meeting all gradation requirements for Pt	D ₅₀ Greater than 4 C _u = $\frac{D_{60}}{D_{10}}$ Between 1 and 3	D ₅₀ Greater than 4 C _u = $\frac{D_{60}}{D_{10}}$ Between 1 and 3	Not meeting all gradation requirements for Pt



Plasticity chart for laboratory classification of fine grained soils

Field Identification Procedures for Fine Grained Soils

These procedures are to be performed on the minus No. 40 sieve size particles, approximately 75% in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dispersivity (Reaction to shaking): After removing particles larger than the No. 40 sieve size, a specimen of soil is placed in a 100-ml. jar, and 50 ml. of water is added. The jar is shaken vigorously for 10 minutes. The soil is then allowed to settle for 15 minutes. The water is poured off, and the soil is remolded. If the soil is cohesive, it will form a lump. If it is non-cohesive, it will fall apart.

Shrinkage: A small amount of soil is placed in a 100-ml. jar, and 50 ml. of water is added. The jar is shaken vigorously for 10 minutes. The soil is then allowed to settle for 15 minutes. The water is poured off, and the soil is remolded. The soil is then allowed to dry in a desiccator for 24 hours. The shrinkage is measured by the change in volume.

Consistency: A small amount of soil is placed in a 100-ml. jar, and 50 ml. of water is added. The jar is shaken vigorously for 10 minutes. The soil is then allowed to settle for 15 minutes. The water is poured off, and the soil is remolded. The soil is then allowed to dry in a desiccator for 24 hours. The consistency is measured by the change in strength.

Atterberg Limits: The liquid limit (LL) and plastic limit (PL) are determined using the standard procedures. The plasticity index (PI) is calculated as the difference between the LL and PL.

Classification: The soil is classified based on the results of the tests. The classification is given in the form of a group symbol (e.g., CL, OL, MH, CH, OH, Pt).

Consistency: Consistency descriptions of coarse-grained soils (GW, GP, GM, GC, SW, SP, SM, SC) are as follows.

<u>Consistency</u>	<u>N Value</u> <u>(ASTM D 1586-67)</u>
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	>50

Consistency descriptions of fine-grained soils (ML, CL, MH, CH,) are as follows:

<u>Consistency</u>	<u>Shear Strength</u> <u>(ksf) (kn/m²)</u>		<u>Field Guide</u>
Very Soft	0.25	12	Sample with height equal to twice the diameter, sags under own weight
Soft	0.25- 0.50	12 - 24	Can be squeezed between thumb and forefinger
Firm	0.50- 1.00	24- 48	Can be molded easily with fingers
Stiff	1.00- 2.00	48- 96	Can be imprinted with slight pressure from fingers
Very Stiff	2.00- 4.00	96- 192	Can be imprinted with considerable pressure from fingers
Hard	over 4.00	over 192	Cannot be imprinted by fingers

Grain Shape: Angular - particles have sharp edges and relatively plane sides with unpolished surfaces.

Subangular - particles are similar to angular but have somewhat rounded edges.

Subrounded - particles exhibit nearly plane sides but have well-rounded corners and edges.

Rounded - particles have smoothly curved sides and no edges.

Calcareous : Containing calcium carbonate; presence of calcium carbonate is commonly identified on the basis of reaction with dilute hydrochloric acid.

Caliche : Soils cemented by porous calcium carbonate and/or other soluble minerals by upward-moving solutions.

Degree of Cementation: (Stages of development of caliche profile)

<u>Stage</u>	<u>Gravelly Soils</u>	<u>Nongravelly Soils</u>
I	Thin, discontinuous pebble coatings	Few filaments or faint coatings
II	Continuous pebble coatings, some interpebble fillings	Few to abundant nodules, flakes, filaments
III	Many interpebble fillings	Many nodules and internodular fillings
IV	Laminar horizon overlying plugged horizon	Increasing carbonate impregnation

Secondary Material : Example - Sand with trace to some silt

Trace - 5-12% (by dry weight)
 Little - 13-20% (by dry weight)
 Some - >21% (by dry weight)

Plasticity : Plasticity index is the range of water content, expressed as a percentage of the weight of the oven-dried soil, through which the soil is plastic. It is defined as the liquid limit minus the plastic limit. Descriptive ranges used on the logs include:

Nonplastic	(PI, 0 - 4)
Slightly Plastic	(PI, 4 - 15)
Medium Plastic	(PI, 15 - 30)
Highly Plastic	(PI, >31)

Cobbles and Boulders : A cobble is a rock fragment, usually rounded by weathering or abrasion, with an average diameter ranging between 3 and 12 inches (8 and 30 cm).

A boulder is a rock fragment, usually rounded by weathering or abrasion, with an average diameter of 12 inches (30 cm) or more.

- I. Remarks - This column was provided on boring and trench logs for comments regarding drilling difficulty, number and size of cobbles or boulders encountered, trench wall stability, loss of drilling fluid in the boring, and other conditions encountered during drilling and excavations.
- J. Dry Density and Moisture Content - The boring logs include a graphical display of laboratory test results for dry density (ASTM D 2937-71) in pounds per cubic foot and kilograms per cubic meter and moisture content (ASTM D 2216-71) in percent from representative samples taken during drilling. The symbols are explained at the bottom of the boring logs.

K. Seive Analysis - The numbers represent the percentage by dry weight (ASTM D 422-63) of each of the following soil components:

GR - Gravel, rock particles that will pass a 3-inch (76 mm) sieve and are retained on No. 4 (4.75 mm) sieve.

SA - Sand, soil particles passing No. 4 sieve and retained on No. 200 (0.075 mm) sieve.

FI - Fines, silt or clay, soil particles passing No. 200 sieve.

L. Atterberg Limits (LL and PI) -

LL - Liquid Limit, the water content corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil (ASTM D 423-66).

PL - Plastic Limit, the water content corresponding to an arbitrary limit between the plastic and the semisolid state of consistency of a soil (ASTM D 424-59).

PI - Plasticity Index, numerical difference between the liquid limit (LL) and the plastic limit (PL) indicating the range of moisture content within which a soil-water mixture is plastic.

NP - Nonplastic.

M. Miscellaneous Information -

Elevations - indicated elevations on the logs are estimated from topographic maps of the study area, within an accuracy of half the contour interval.

Surficial
Geologic Unit - indicates the surficial geologic unit in which the activity is located.

Date Drilled - indicates the period from beginning to completion of the activity.

Drilling
Method - signifies the type of drilling procedure used such as rotary wash.

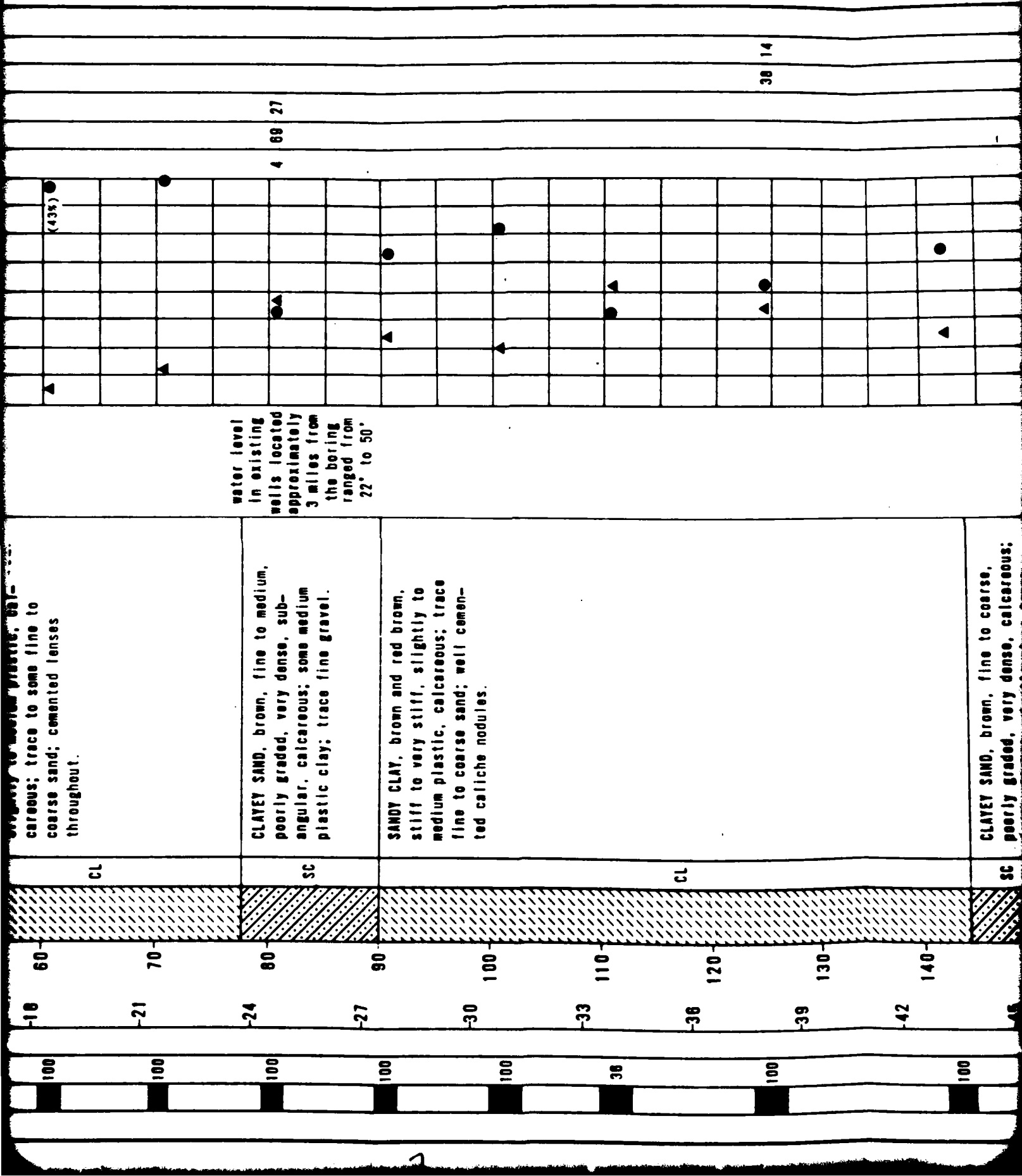
Hole Diameter - nominal size of boring drilled.

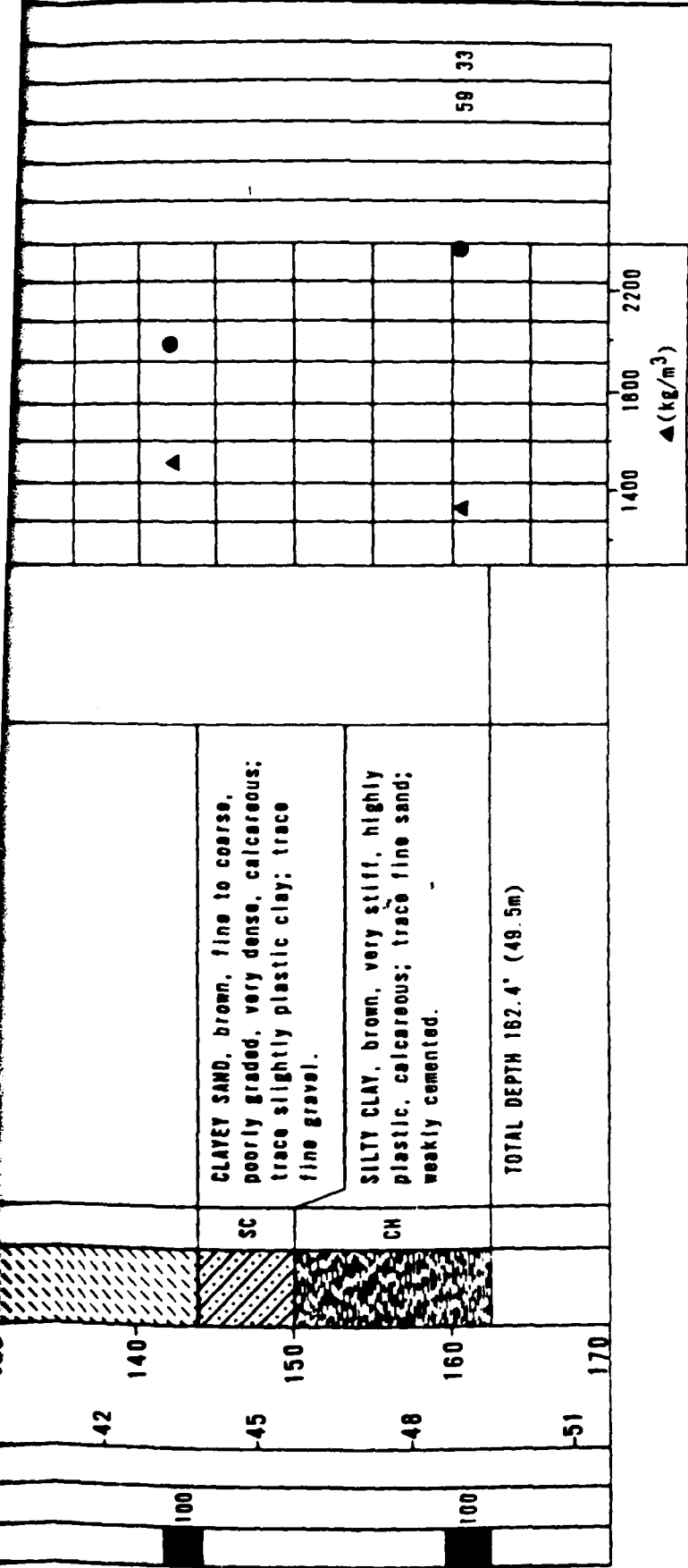
Water Level - indicates depth from ground surface to water table where encountered.

Trench Length - length at ground surface of final trench excavation.

Trench
Orientation - bearing of longitudinal trench centerline.

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS
98	70	0	0	0	SM	SW	SILTY SAND, brown, fine, poorly graded, loose, subangular, calcareous; some silt.	
70	70	3	10	10	CH	CH	SILTY CLAY, light brown to brown, stiff to hard, medium to highly plastic, calcareous; trace to some fine to coarse sand; well cemented caliche nodules.	
100	100	6	20	20	CH	CH		
100	100	9	30	30	CL	CL		
100	100	12	40	40	SM	SM	SILTY SAND, brown, fine, poorly graded medium dense, subangular; some silt; cemented caliche nodules.	
100	100	15	50	50	CL	CL	SILTY CLAY, light brown, hard, slightly plastic, calcareous; trace fine sand, lense of silty sand (51.0'-54.0').	
100	100	18	60	60	SM	SM	SANDY CLAY, brown, stiff to hard, slightly to medium plastic, calcareous; trace to some fine to coarse sand; cemented lenses	





EXPLANATION

■ FUGRO DRIVE SAMPLE

□ BULK SAMPLE

■ PITCHER TUBE SAMPLE

□ STANDARD PENETRATION TEST SAMPLE

▨ CORE SAMPLE

N - STANDARD PENETRATION RESISTANCE

▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)

● - MOISTURE CONTENT (ASTM: D-2216-71)

NR - NO RECOVERY

BORING DETAILS

ELEVATION : 5374' (1638m)
 SURFICIAL GEOLOGIC UNIT : A5y/A40
 DATE DRILLED : 1 December 1978
 DRILLING METHOD : Rotary Wash
 HOLE DIAMETER : 4 7/8" (124mm)
 WATER LEVEL : See Remarks

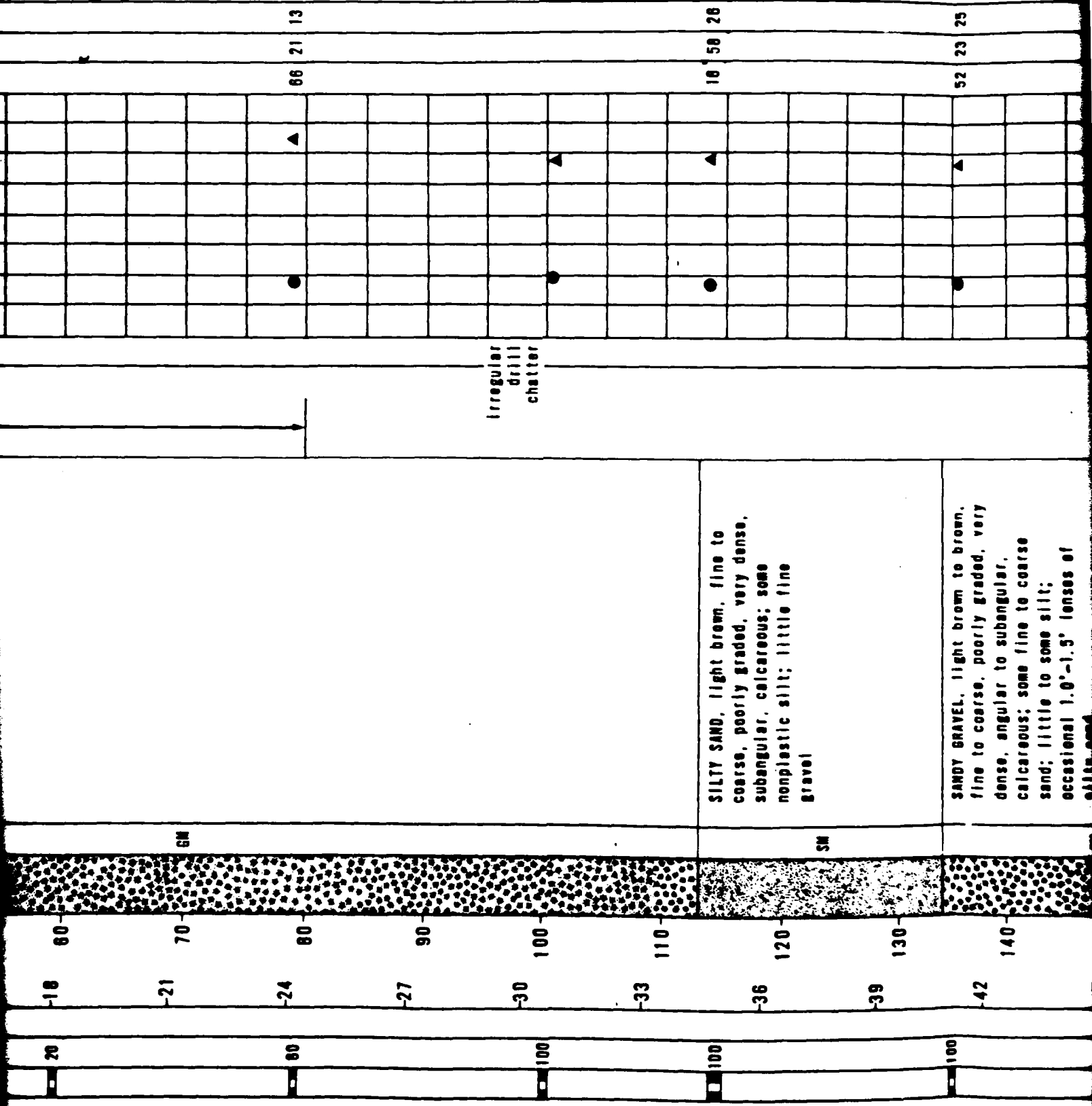
LOG OF BORING WR-8-3
 VERIFICATION SITE, WHITE RIVER COP, NEVADA

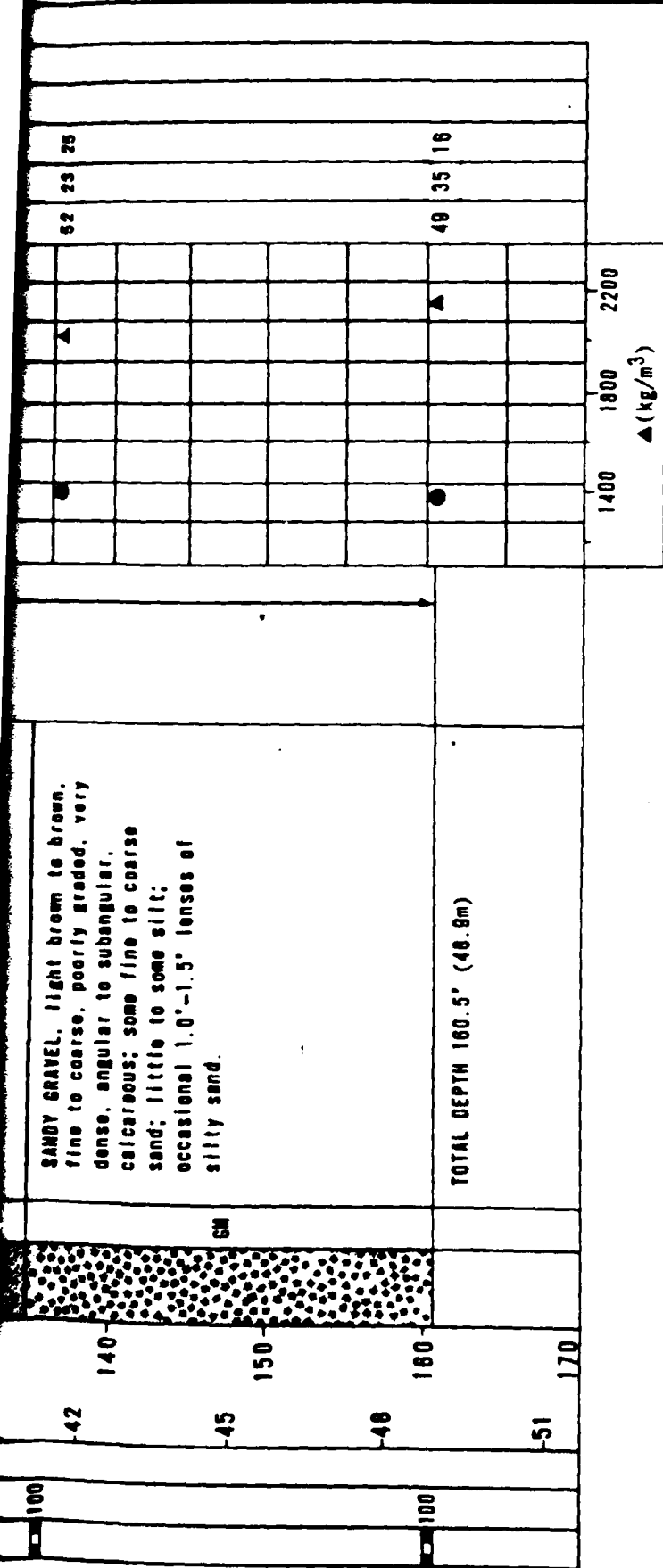
BY SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
 6-3

FUGRO NATIONAL, INC.

2 JUL 70





EXPLANATION

■ FUGRO DRIVE SAMPLE

□ BULK SAMPLE

■ PITCHER TUBE SAMPLE

□ STANDARD PENETRATION TEST SAMPLE

▨ CORE SAMPLE

N - STANDARD PENETRATION RESISTANCE

▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)

● - MOISTURE CONTENT (ASTM: D-2216-71)

NR - NO RECOVERY

BORING DETAILS

ELEVATION : 5670' (1720m)
 SURFICIAL GEOLOGIC UNIT : ASI
 DATE DRILLED : 29-30 November 1978
 DRILLING METHOD : Rotary Wash
 HOLE DIAMETER : 4 7/8" (124mm)
 WATER LEVEL : Not Encountered

LOG OF BORING UR-D-2
 VERIFICATION SITE, WHITE RIVER COP, NEVADA

UR SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
 8-2

FUGRO NATIONAL, INC.

AFV-86

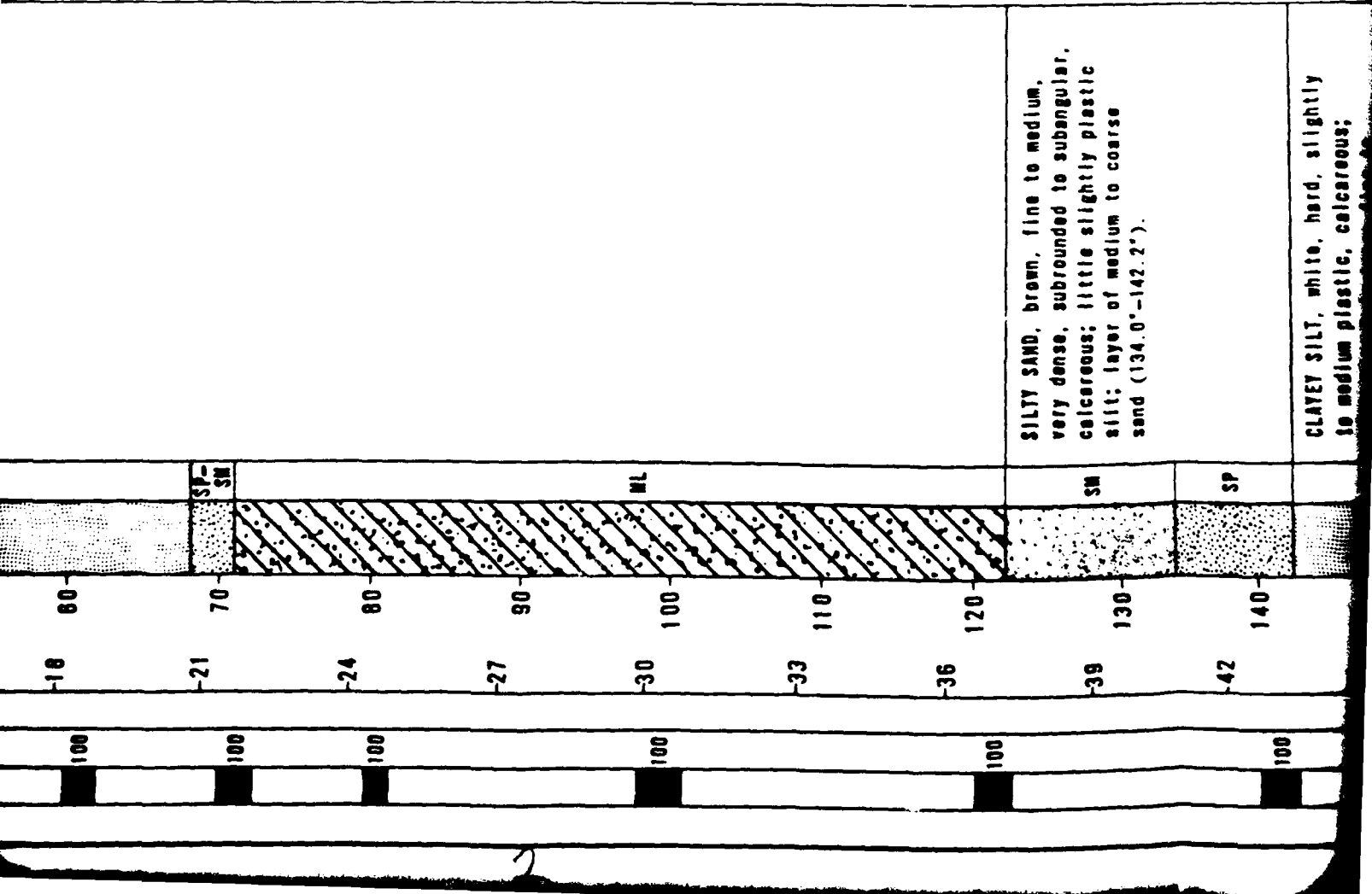
CHECKED BY

APPROVED BY

2 JUL 70

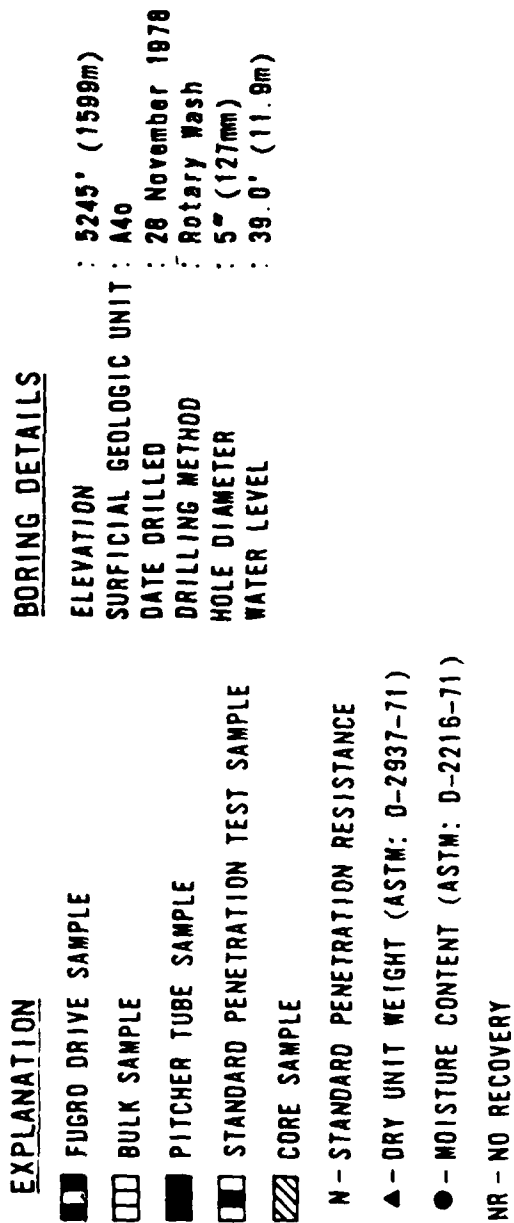
FM-TR-27-V

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf)													SIEVE ANALYSIS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
									5	10	15	20	25	30	35	80	100	110	120	130	140	GR	SA	FI	LL	PI																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	100		0	0		SM	SILTY SAND, dark brown to light brown, fine to coarse, poorly graded, dense, subangular to subrounded, calcareous; trace to some silt.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				</








SILTY SAND, brown, fine to medium, very dense, subrounded to subangular, calcareous; little slightly plastic silt; layer of medium to coarse sand (134.0'-142.2').

CLAYEY SILT, white, hard, slightly to medium plastic, calcareous;



EXPLANATION

ELEVATION : 5245' (1599m)
SURFICIAL GEOLOGIC UNIT : A40
DATE DRILLED : 28 November 1980
DRILLING METHOD : Rotary Wash
HOLE DIAMETER : 5" (127mm)
WATER LEVEL : 39.0' (11.9m)

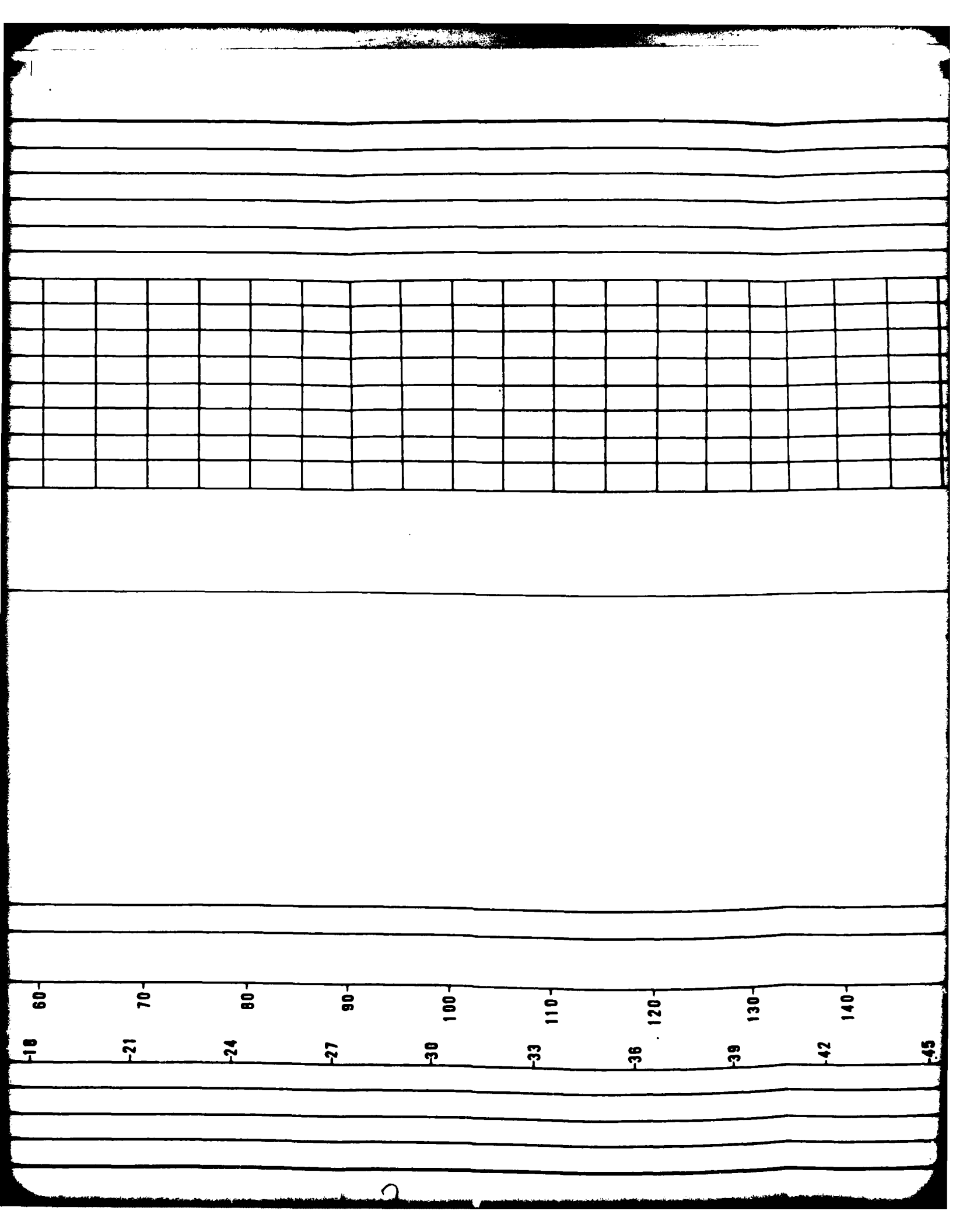
 FUGRO DRIVE SAMPLE
 BULK SAMPLE
 PITCHER TUBE SAMPLE
 STANDARD PENETRATION TEST SAMPLE
 CORE SAMPLE
 N - STANDARD PENETRATION RESISTANCE
 ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
 ● - MOISTURE CONTENT (ASTM: D-2216-71)
 NR - NO RECOVERY

LOG OF BORING WR-B-1
VERIFICATION SITE, WHITE RIVER CBP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
6-1

FUGRO NATIONAL, INC.



-42 140
-45 150
-48 160
-51 170

1400 1800 2200
Δ(kg/m³)

EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- ▨ CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

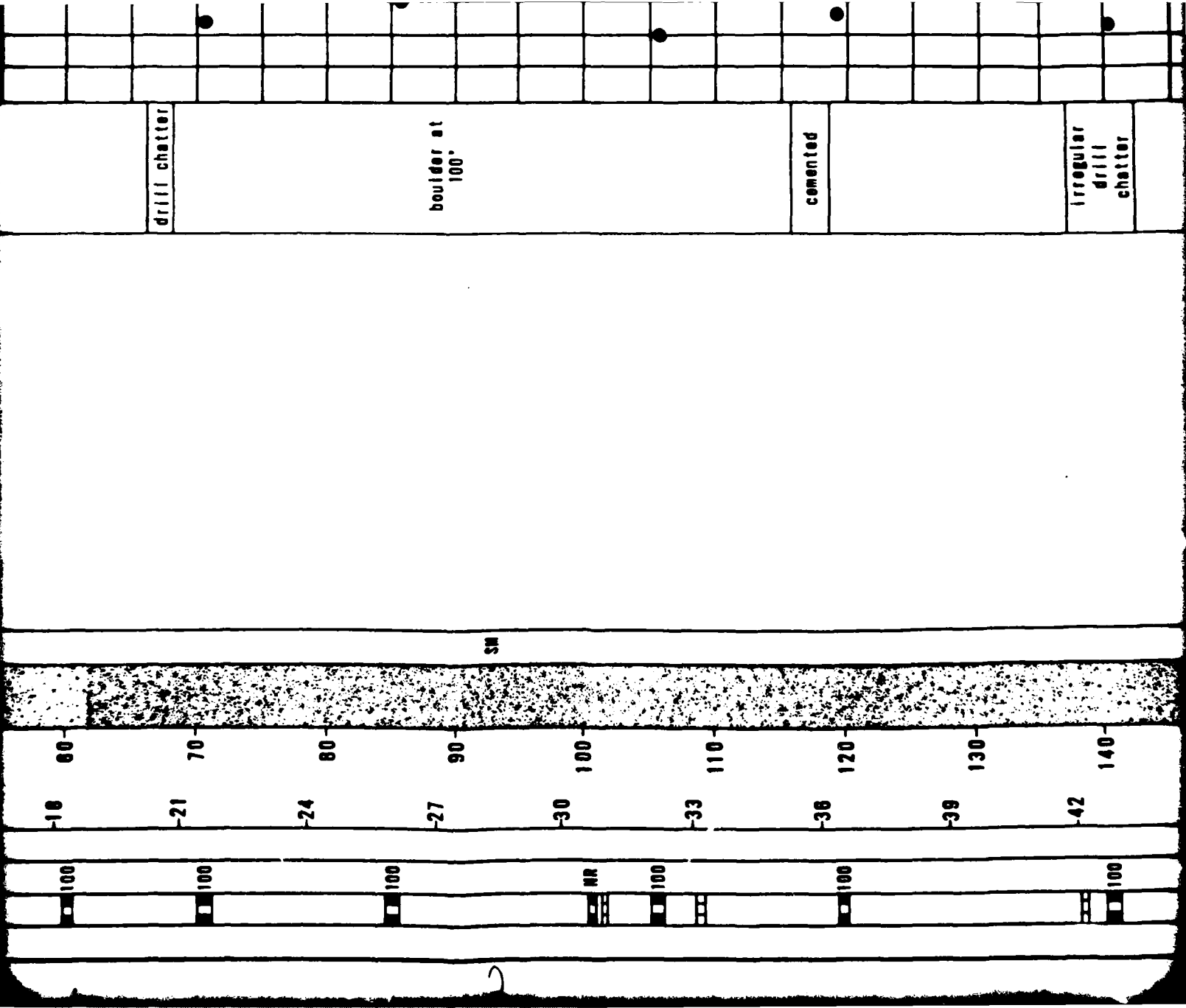
ELEVATION : 5240' (1587m)
SURFICIAL GEOLOGIC UNIT : A5y (A4o)
DATE DRILLED : 8 December 1978
DRILLING METHOD : Rotary Wash
HOLE DIAMETER : 4 7/8" (124mm)
WATER LEVEL : Not Encountered

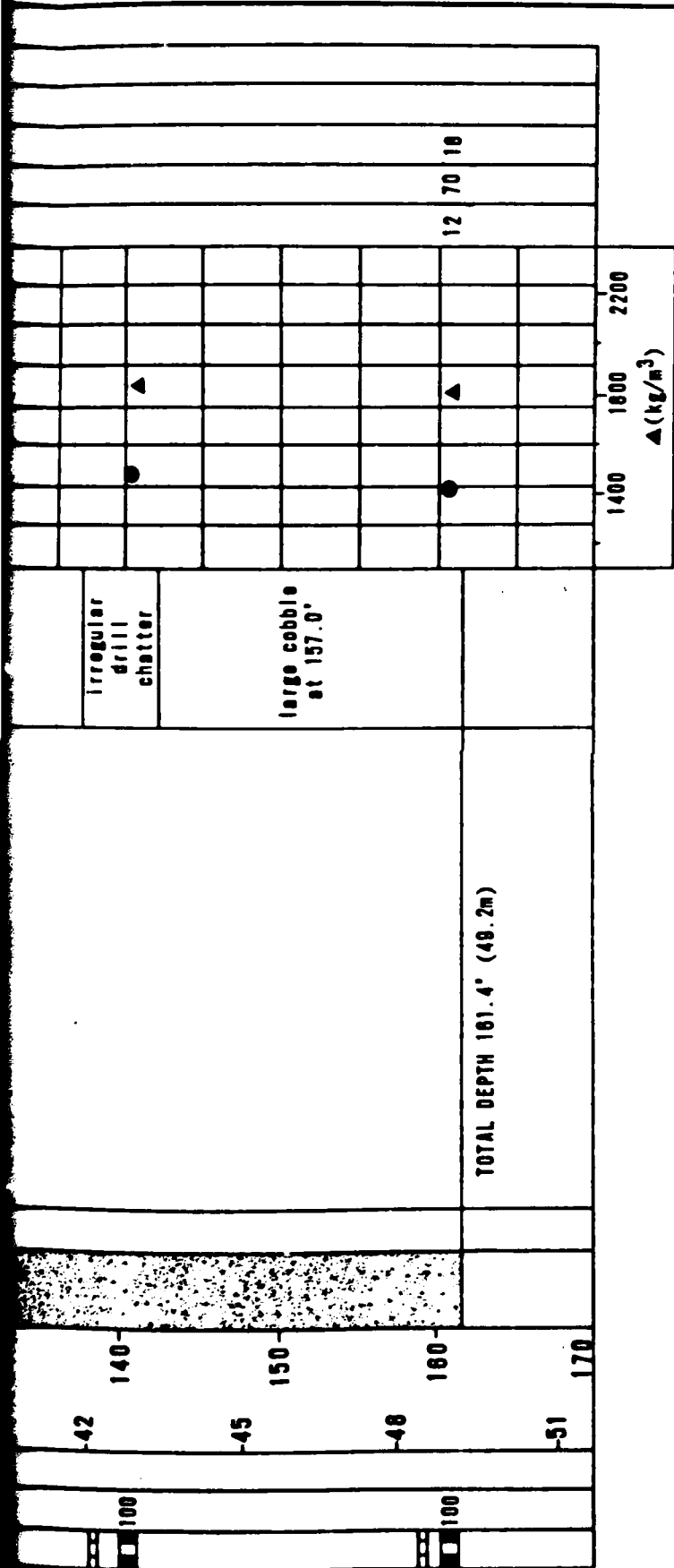
LOG OF BORING WR-B-7 VERIFICATION SITE, WHITE RIVER COP, NEVADA	
MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE - SANSO	FIGURE 6-7
FUGRO NATIONAL INC.	

CHECKED BY _____ APPROVED BY _____

2 JUL 78

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲ (pcf)										SIEVE ANALYSIS		
									80	90	100	110	120	130	140	GR	SA	FI	LL	PI	
	83		0	0			GRAVELLY SAND, light brown to brown, fine to coarse, poorly graded, very dense, subangular, calcareous; some fine to coarse gravel; trace to some silt; cemented nodules.		▲	●						27	47	28			
	80								●	▲						28	50	22			
	100								●			▲				47	52	11			
	100		3	10		SM			●		▲										
	100								●		▲					28	55	18			
	100		6	20		GM-GM	SANDY GRAVEL, light brown, fine to coarse, well to poorly graded, very dense, subangular, calcareous; some fine to coarse sand.			●	▲					51	44	5			
	100								●			▲									
	100		9	30		GP-GM			●			▲				47	44	9			
	100																				
	100		12	40			GRAVELLY SAND, yellow brown to red brown, fine to coarse, poorly graded, very dense, subangular, calcareous; trace to some fine to coarse gravel; trace to some silt; cemented lenses (3" - 12") throughout.			●	▲					6	63	31			
	100																				
	100		15	50					●												
	100		18	60												28	55	17			





EXPLANATION

■ FUGRO DRIVE SAMPLE

□ BULK SAMPLE

■ PITCHER TUBE SAMPLE

□ STANDARD PENETRATION TEST SAMPLE

▨ CORE SAMPLE

N - STANDARD PENETRATION RESISTANCE

▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)

● - MOISTURE CONTENT (ASTM: D-2216-71)

NR - NO RECOVERY

BORING DETAILS

ELEVATION : 5845' (1721m)
 SURFICIAL GEOLOGIC UNIT : A51
 DATE DRILLED : 4-5 December 1978
 DRILLING METHOD : Rotary Wash
 HOLE DIAMETER : 4 7/8" (124mm)
 WATER LEVEL : Not Encountered

LOG OF BORING WR-B-6
 VERIFICATION SITE, WHITE RIVER COP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAUSO

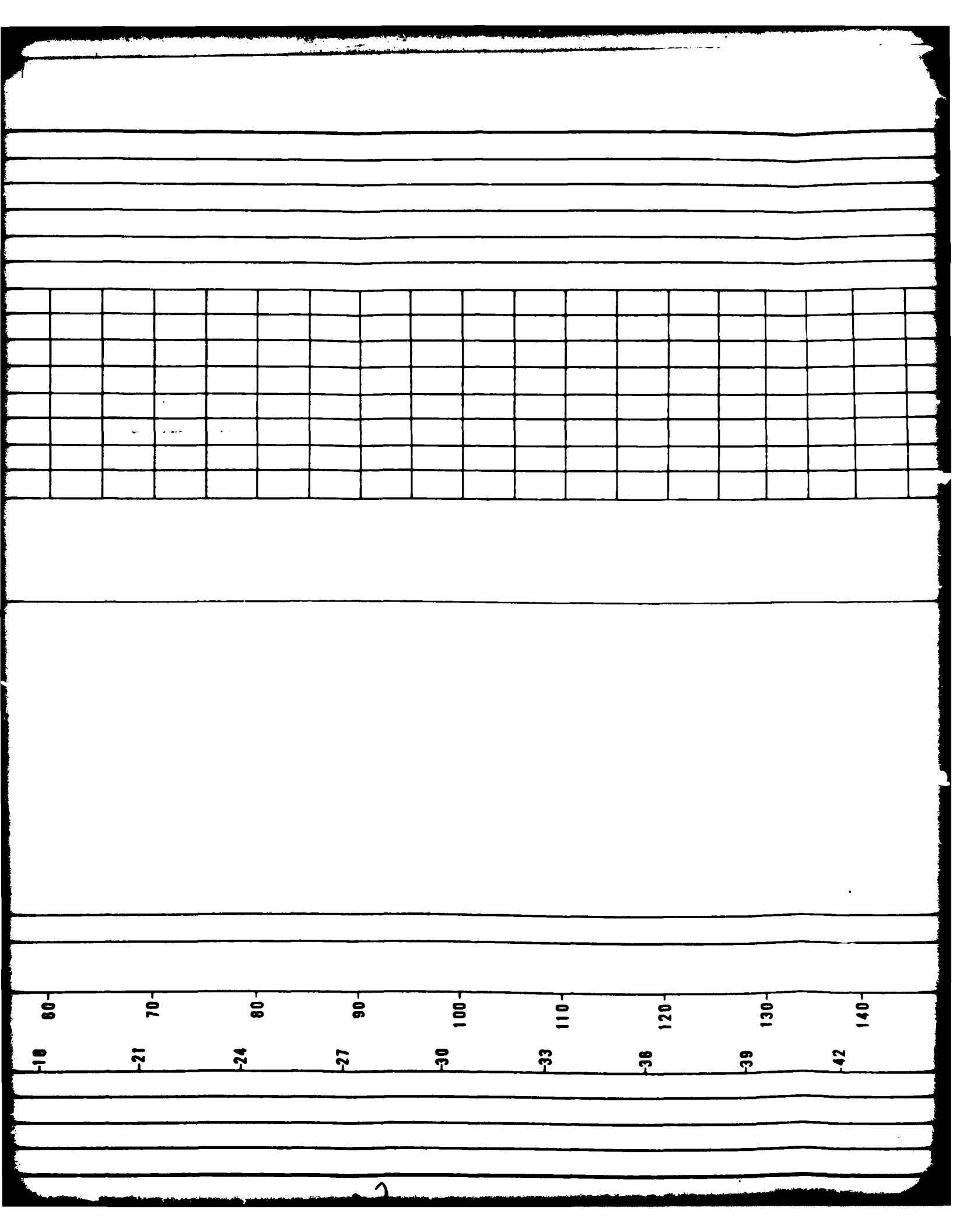
FIGURE
 6-6

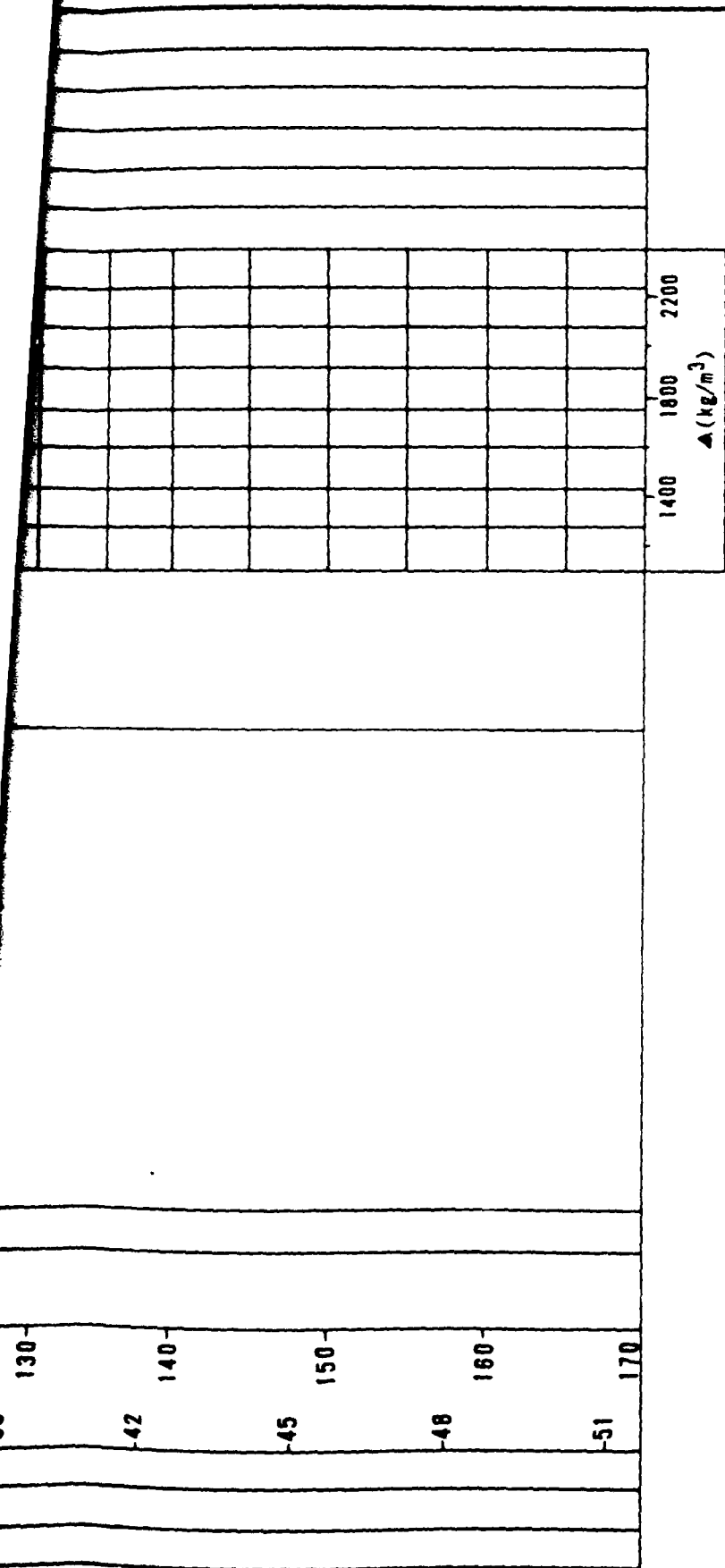
FUGRO NATIONAL INC.

AFI-88

3

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS
GR	87		0	0	SM	SM	SILTY SAND, brown, fine to coarse, poorly graded, very dense, calcareous; some slightly plastic silt; trace to little fine gravel.	
NR	NR							
GP-60	100							
GP-43	43							
GP-30	30		3	10	SP-SM	SM	GRAVELLY SAND, brown, fine to coarse, poorly graded, very dense, cal- careous; some fine to coarse gravel; trace silt.	
GP-70	70							
GP-100	100		8	20	GC	GC	SANDY GRAVEL, brown, fine to coarse, poorly graded, very dense, subangular to subrounded, calcareous; some fine to coarse sand; trace to little slightly plastic silt and clay.	
GP-86	86							
GP-89	89		9	30	GP-GC	GC		
GP-75	75		12	40	GP-GM	GM		
GP-100	100		15	50				
			18	60			TOTAL DEPTH 53.5' (16.3m)	





EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- ▨ CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

ELEVATION : 5838' (1718m)
 SURFICIAL GEOLOGIC UNIT : A5y
 DATE DRILLED : 3-4 December 1978
 DRILLING METHOD : Rotary Wash
 HOLE DIAMETER : 4 7/8" (124mm)
 WATER LEVEL : Not Encountered

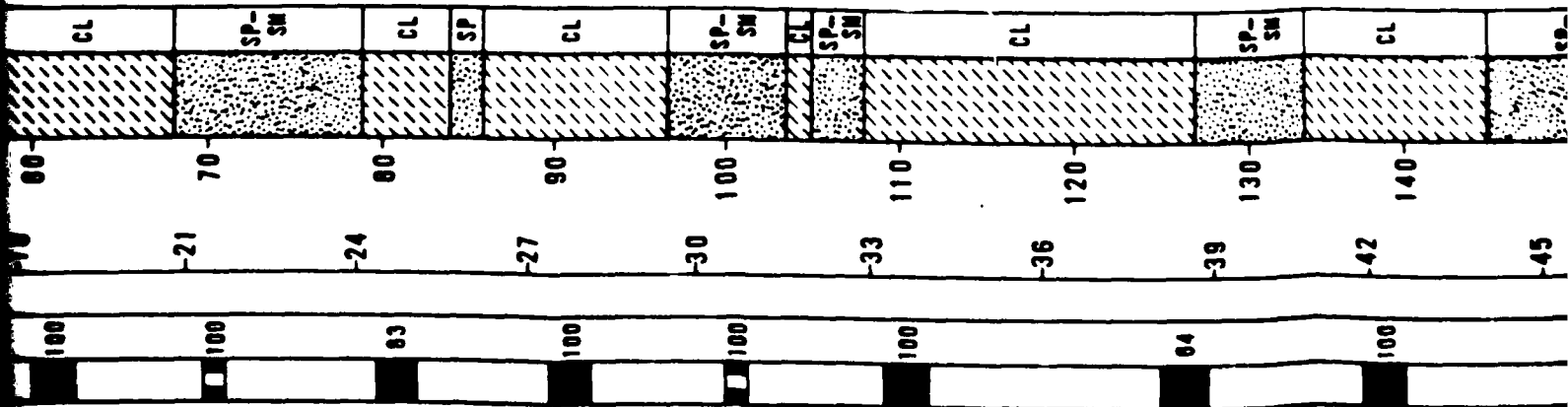
LOG OF BORING WR-B-5 VERIFICATION SITE, WHITE RIVER COP, NEVADA	
MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE - SAMS	FIGURE 6-5
FUGRO NATIONAL INC.	

CHECKED BY _____ APPROVED BY _____

2 JUL 70

SAMPLE TYPE	% RECOVERY	N VALUE	METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf)												SIEVE ANALYSIS			
									5	10	15	20	25	30	35	GR	SA	FI	LL	PI				
100	100		0	0		SC	CLAYEY SAND, brown, fine to coarse, poorly graded, dense, subangular to subrounded, calcareous; some highly plastic clay.	water level at 11.0'	▲			●					0	83	37					
100	100										▲		●					4	58	40				
67	57		3	10		ML	SANDY SILT, gray, stiff, medium plastic, calcareous; little silt.														48	18		
93	73		6	20		SP-SM	SILTY SAND and SAND, brown, fine to coarse, poorly graded, medium dense to dense, subrounded to subangular; trace to some silt.					▲						3	88	8				
100	100		9	30		SM						●					0	85	35					
100	100		12	40		CL	Alternate layers of CLAY and SAND: CLAY: SILTY CLAY, brown, stiff to hard slightly to medium plastic, calcareous; trace fine sand.		▲								0	76	24		NP			
100	100		15	50		SW	SAND: GRAVELLY SAND, brown to dark brown, fine to coarse, poorly graded, very dense, subangular to subrounded; trace to little fine gravel; trace nonplastic to										15	81	4					
100	100		18	60					▲							(25%)				35	11			

subrounded; trace to little fine
gravel; trace nonplastic to
slightly plastic silt.



occasional coarse gravel

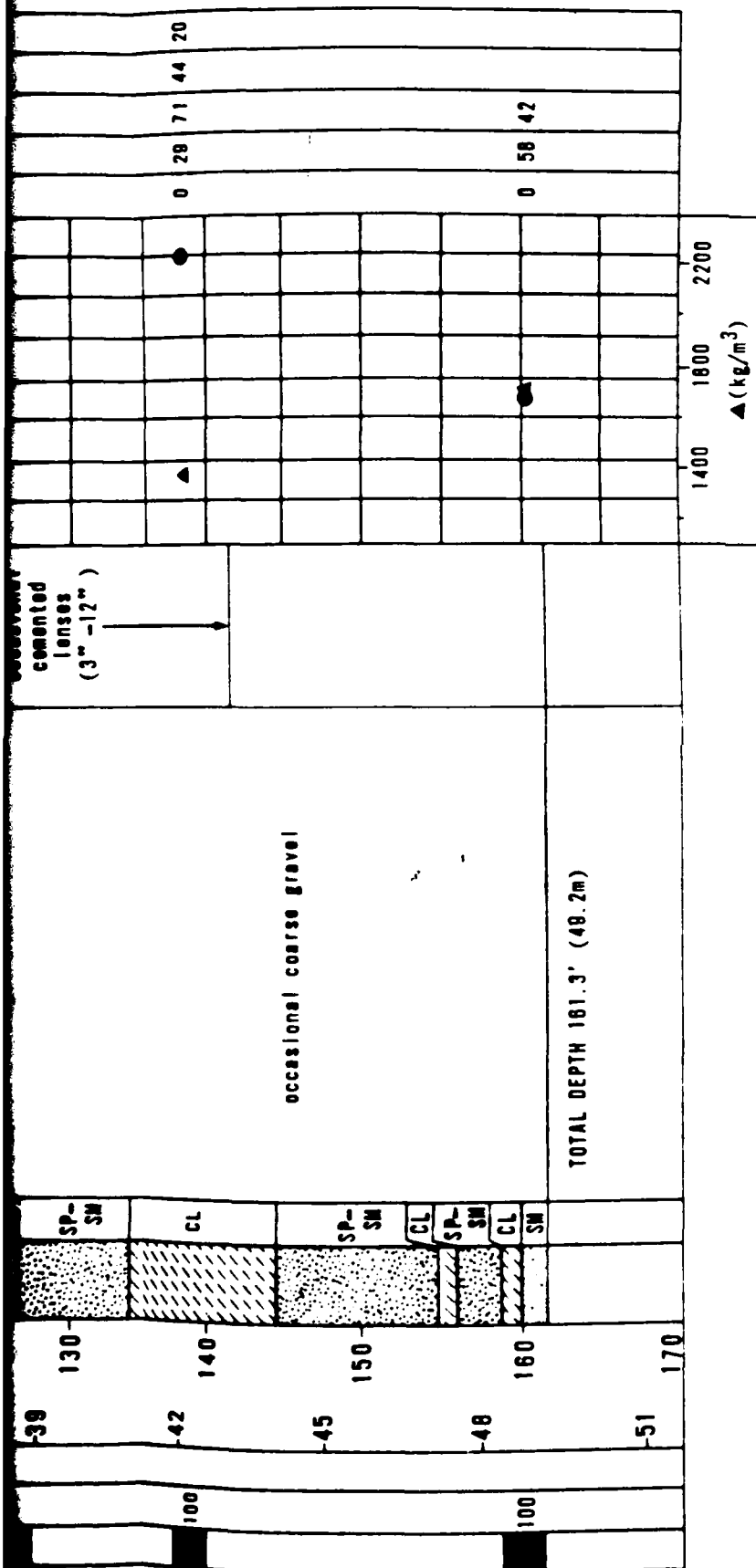
35 11

12 81 7

18 75 6

0 28 71 44 20

occasional
cemented
lenses
(3"-12")



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- ▨ CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

ELEVATION : 5440' (1658m)
SURFICIAL GEOLOGIC UNIT : A40
DATE DRILLED : 2-3 December 1970
DRILLING METHOD : Rotary Wash
HOLE DIAMETER : 5" (127mm)
WATER LEVEL : 11.0' (3.4m)

LOG OF BORING WR-0-4
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE SAMSO

FIGURE
6-4

FUGRO NATIONAL, INC.

AD-A113 327

FUGRO NATIONAL INC LONG BEACH CA

F/G 8/13

MX SITING INVESTIGATION. GEOTECHNICAL EVALUATION. VOLUME V. NEV--ETC(U)

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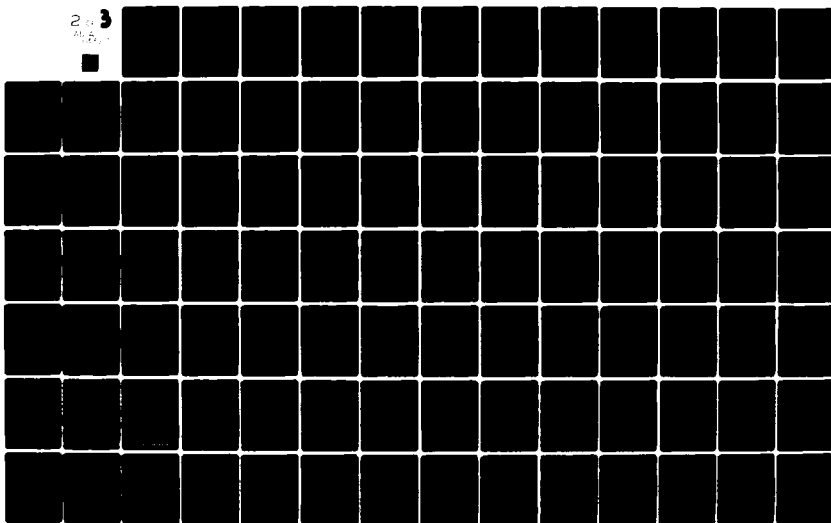
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FN-TR-27-5

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Page 1



A
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SECTION 7.0
TRENCH AND TEST PIT LOGS

FN-TR-27-V

EXPLANATIONS OF TRENCH AND TEST PIT LOGS

See Section 6.0, "Boring Logs", for explanations.

FN-TR-27-V

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0				GRAVELLY SAND, light brown, fine to coarse, poorly graded, moist, calcareous; some fine to coarse sub-angular gravel; little silt; stage II caliche (0.5'-2.0'); stage III caliche (2.0'-3.0').	vertical walls stable	34	53	13		
	2		SM	loose							
	4										
	6		SP	medium dense	SAND, brown, fine to coarse, poorly graded, slightly moist, calcareous, trace fine gravel.						
	8				SANDY SILT, light brown, dry, slightly plastic, calcareous; little fine to coarse poorly graded sand; stage II caliche (5.5'-11.0'); stage III caliche (11.0'-14.0').						
	10		ML	very stiff							
	12										
	14			hard							
	18				TOTAL DEPTH 14.0' (4.3m)						
	20										

TRENCH DETAILS

SURFACE ELEVATION : 5240' (1597m)
 DATE EXCAVATED : 28 NOVEMBER 1978
 SURFICIAL GEOLOGIC UNIT : A5y (A4e)
 TRENCH LENGTH : 15.0' (4.6m)
 TRENCH ORIENTATION : E-W

LOG OF TRENCH WR-T-1
 VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAMS0

FIGURE
 7-1

FUGRO NATIONAL, INC.

2 JUL 79

AFV-04

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BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0		SM	loose	SILTY SAND, brown, fine to coarse, poorly graded, moist, subangular to angular, calcareous; little fine to coarse gravel.	vertical walls stable	14	44	42		
	2			medium dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; some fine to coarse sand; occasional cobbles to 10" size; stage <input checked="" type="checkbox"/> caliche (1.5'-3.0').						
	4		GP	very dense							
	6										
	2						84	14	2		
	8				TOTAL DEPTH 7.0' (2.1m)	cementation at 7.0' exceeded capacity of Case 580C backhoe					
	10										
	12										
	14										
	16										
	18										
	20										

TRENCH DETAILS

SURFACE ELEVATION : 5645' (1721m)
 DATE EXCAVATED : 29 NOVEMBER 1978
 SURFICIAL GEOLOGIC UNIT: ASI
 TRENCH LENGTH : 12.0' (3.7m)
 TRENCH ORIENTATION : NE-SW

LOG OF TRENCH WR-T-2
 VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
 7-2

FUGRO NATIONAL, INC.

CHECKED BY _____ APPROVED BY _____

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0			loose	SILTY SAND, brown and white, fine to coarse, poorly graded, dry, angular to subangular, calcareous; slightly plastic silt; stage III caliche (2.0'-3.0').	vertical walls stable	1	72	27		
	2											
	4			SM								
	6				medium dense							
	8					CLAY, white, dry, medium plastic, calcareous.					48	23
	10											
	12			CL	stiff							
	14											
	16					TOTAL DEPTH 14.0' (4.3m)						
	18											
	20											

TRENCH DETAILS

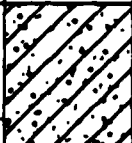
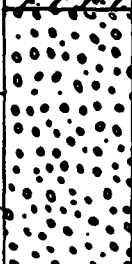
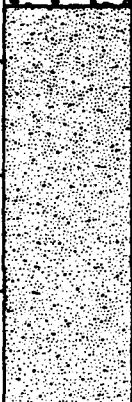
SURFACE ELEVATION : 5245' (1598m)
 DATE EXCAVATED : 30 NOVEMBER 1978
 SURFICIAL GEOLOGIC UNIT: A4a
 TRENCH LENGTH : 15.0' (4.6m)
 TRENCH ORIENTATION : E-W

LOG OF TRENCH WR-T-3
 VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
 7-3

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0		ML	soft	SANDY SILT, light brown, slightly moist, nonplastic, calcareous; some fine to coarse poorly graded sand; trace fine to coarse gravel.	vertical walls stable	8	37	55	24	1
	2											
1			GP	medium dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, dry, sub-angular to angular, calcareous; some fine to coarse sand.							
4												
2			SM	medium dense	SILTY SAND, light brown, fine to coarse, poorly graded, dry, sub-angular, calcareous.							
8												
3	10											
	12											
4												
	14					TOTAL DEPTH 14.0' (4.3m)						
	16											
5												
	18											
6												
	20											

TRENCH DETAILS

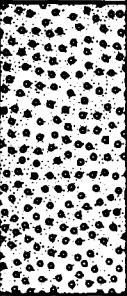
SURFACE ELEVATION : 5320' (1622m)
 DATE EXCAVATED : 1 DECEMBER 1978
 SURFICIAL GEOLOGIC UNIT: A4a
 TRENCH LENGTH : 14.0' (4.3m)
 TRENCH ORIENTATION : E-W

LOG OF TRENCH WR-T-4
 VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
 7-4

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0		GM	medium dense	SANDY GRAVEL, brown, fine, poorly graded, dry, angular to subangular, calcareous; some silt and fine to coarse sand; stage III to stage IV caliche (2.0'-5.0').	vertical walls stable	38	30	32	NP	
	2				dense							
	4				very dense							
	5											
	8					TOTAL DEPTH 5.0' (1.5m)	cementation at 5.0' exceeded capacity of Case 580C backhoe					
	10											
	12											
	14											
	16											
	18											
	20											

TRENCH DETAILS

SURFACE ELEVATION : 5670' (1728m)
 DATE EXCAVATED : 2 DECEMBER 1978
 SURFICIAL GEOLOGIC UNIT: ASI
 TRENCH LENGTH : 9.0' (2.7m)
 TRENCH ORIENTATION : NE-SW

LOG OF TRENCH WR-T-5
 VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAMS0

FIGURE
 7-5

FUGRO NATIONAL, INC.

FM-TR-27-Y

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0		SP	loose	SAND, brown, fine to medium, poorly graded, moist, calcareous.	vertical wells stable					
	2	2		CH	very stiff	CLAY, gray, slightly moist, medium plastic, calcareous; little fine to coarse poorly graded sand; trace fine gravel; stage II caliche (1.5"-3.0").		2	13	85	50	24
	8	8		CL	stiff	SANDY CLAY, light brown, dry, slightly plastic, calcareous; little fine to coarse sand.						
	14	14				TOTAL DEPTH 14.0' (4.3m)						

TRENCH DETAILS

SURFACE ELEVATION : 5374' (1638m)
 DATE EXCAVATED : 3 DECEMBER 1978
 SURFICIAL GEOLOGIC UNIT : A5y/A4a
 TRENCH LENGTH : 14.0' (4.3m)
 TRENCH ORIENTATION : E-W

LOG OF TRENCH WR-T-6
 VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
 7-6

FURRO NATIONAL, INC.

2 JUL 79

AFV-04

CHECKED BY _____ APPROVED BY _____

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0		SM	loose	SILTY SAND, brown, fine to coarse, poorly graded, moist, calcareous; some nonplastic silt; little fine gravel.	vertical walls stable	15	36	48		NP
	2			GP	medium dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, dry, sub-angular to angular, calcareous; some fine to coarse sand; stage II caliche (1.5'-5.0').						
	4											
	6											
	8											
	10					TOTAL DEPTH 10.0' (3.0m)	cementation at 10.0' exceeded capacity of Case 580C backhoe					
	12											
	14											
	16											
	18											
	20											

TRENCH DETAILS

SURFACE ELEVATION : 5636' (1718m)
 DATE EXCAVATED : 4 DECEMBER 1978
 SURFICIAL GEOLOGIC UNIT : ASy
 TRENCH LENGTH : 14.0' (4.3m)
 TRENCH ORIENTATION : E-W

LOG OF TRENCH WR-T-7 VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
 7-7

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0		SP	loose	SAND, brown, fine to medium, poorly graded, moist, calcareous.						
	2		SC	medium dense	CLAYEY SAND, light brown, fine to coarse, poorly graded, slightly moist, calcareous; some highly plastic clay.		1	57	42	67	35
	4		CH	very stiff	CLAY, brown, slightly moist, highly plastic.	vertical walls stable					
	8										
	10										
	12		ML	soft	SANDY SILT, dark brown, wet, slightly plastic; some fine sand.	water level 11.0'					
	14										
	16				TOTAL DEPTH 14.0' (4.3m)						
	18										
	20										

TRENCH DETAILS

SURFACE ELEVATION : 5440' (1658m)
 DATE EXCAVATED : 5 DECEMBER 1978
 SURFICIAL GEOLOGIC UNIT : A4e
 TRENCH LENGTH : 14.0' (4.3m)
 TRENCH ORIENTATION : E-W

LOG OF TRENCH WR-T-8
 VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
 7-8

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0										
	0										
	1		CL	soft	SANDY CLAY, brown, moist, slightly plastic, calcareous; some fine to coarse poorly graded sand; trace fine gravel.						
	2										
	3		GP	medium dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; some fine to coarse sand; stage I caliche (1.0'-5.0').						
	4										
	5										
					TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5397' (1645m)
SURFICIAL GEOLOGIC UNIT: ASy

LOG OF TEST PIT WR-P-1

	0										
	0										
	1		CL	soft	SANDY CLAY, brown, moist, medium plastic, calcareous; little fine to coarse poorly graded sand; trace fine gravel.						
	2										
	3		GP	medium dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, slightly moist, rounded to subangular, calcareous; little fine to coarse sand; stage II caliche (1.0'-5.0').						
	4										
	5										
					TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5485 (1672m)
SURFICIAL GEOLOGIC UNIT: ASy

LOG OF TEST PIT WR-P-2

LOGS OF TEST PITS WR-P-1 AND WR-P-2
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSQ

FIGURE
7-9

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS					
							GR	SA	FI	LL	PI	
	0											
	0		CL	firm	SANDY CLAY, brown, moist, slightly plastic, calcareous; some fine to coarse poorly graded sand; little fine to coarse gravel.		20	26	54	27	8	
	1											
	2		GP	very dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; some fine to coarse sand; stage II caliche (1.5'-3.0'); stage III caliche at 3.0'.							
	3											
	1				TOTAL DEPTH 3.0' (0.9m)	cementation at 3.0' exceeded capacity of Case 580C backhoe						
	4											
	5											

SURFACE ELEVATION: 5840' (1719m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT WR-P-3

	0		CL	firm	SANDY CLAY, brown, moist, slightly plastic, calcareous; some fine to coarse poorly graded sand; little fine gravel.							
	1											
	2			medium dense	GRAVELLY SAND, gray brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; some fine to coarse gravel; occasional cobbles to 4" size; stage I caliche (1.0'-3.0').							
	3		SP									
	4			loose								
	5											
					TOTAL DEPTH 5.0' (1.5m)							

SURFACE ELEVATION: 5840' (1780m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT WR-P-4

LOGS OF TEST PITS WR-P-3 AND WR-P-4
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMS0

FIGURE
7-10

FUGRO NATIONAL, INC.

2 JUL 78

AFV-03

CHECKED BY _____ APPROVED BY _____

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0				SILTY SAND, brown and gray, fine to coarse, poorly graded, moist, sub-angular, calcareous; trace fine gravel.						
	1			loose							
	2										
	3		SM	medium dense							
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5430' (1655m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT WR-P-5

	0				SILTY SAND, brown, fine to coarse, poorly graded, moist, subangular, calcareous; occasional cobbles to 5" size.						
	1										
	2										
	3		SM	loose			1	80	19		
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5485' (1672m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT WR-P-6

LOGS OF TEST PITS WR-P-5 AND WR-P-6
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
7-11

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0										
	1		SM	loose	SILTY SAND, brown, fine to coarse, poorly graded, moist, subangular to angular, calcareous; some non-plastic silt; little fine gravel; stage II caliche (1.5'-2.5').		18	36	48		NP
	2			medium dense							
	3		GP	medium dense	SANDY GRAVEL, brown, fine to coarse, poorly graded, slightly moist, subangular to angular, calcareous; some fine to coarse sand; stage I caliche (2.5'-5.0').						
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5530' (1686m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT WR-P-7

	0				SILTY SAND, brown, fine to coarse, poorly graded, moist, subangular to angular, calcareous.		4	58	37		
	1		SM	loose							
	2			medium dense	SILTY SAND, light brown, fine to coarse, poorly graded, dry, subangular to subrounded, calcareous; trace fine to coarse gravel; occasional cobbles to 8" size.						
	3										
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5330' (1625m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT WR-P-8

LOGS OF TEST PITS WR-P-7 AND WR-P-8
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
7-12

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS					
	METERS	FEET						GR	SA	FI	LL	PI	
	0	0				SILTY SAND, brown, fine to coarse, poorly graded, moist, subangular to angular, calcareous; some silt.							
		1		SM	loose			1	78	22			
		2											
		3		CL	stiff	SILTY CLAY, light brown, slightly moist, slightly plastic, calcareous; trace fine sand.							
		4											
		5											
						TOTAL DEPTH 5.0' (1.5m)							

SURFACE ELEVATION: 5230' (1584m)
SURFICIAL GEOLOGIC UNIT: A4g

LOG OF TEST PIT WR-P-9

	0	0				SILTY SAND, brown, fine to coarse, poorly graded, moist, subangular to angular, calcareous; stage III caliche (1.5'-5.0').							
		1			loose								
		2		SM									
		3			medium dense								
		4											
		5											
						TOTAL DEPTH 5.0' (1.5m)							

SURFACE ELEVATION: 5240' (1597m)
SURFICIAL GEOLOGIC UNIT: A4g

LOG OF TEST PIT WR-P-10

LOGS OF TEST PITS WR-P-9 AND WR-P-10
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANJO

FIGURE
7-13

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0		SM	loose	SILTY SAND, brown, fine, poorly graded, moist, calcareous.						
	1					SANDY SILT, light brown, slightly moist, nonplastic, calcareous; some fine to medium poorly graded sand.		0	38	64		NP
	2											
	3			ML	firm							
	4											
	5											
						TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5320' (1622m)
SURFICIAL GEOLOGIC UNIT: A4a

LOG OF TEST PIT WR-P-11

	0	0		SC	loose	CLAYEY SAND, brown, fine to coarse, poorly graded, moist, angular, calcareous; trace fine gravel.						
	1			GP	very dense	SANDY GRAVEL, light gray, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some fine to coarse sand; occasional cobbles to 5" size; stage IX caliche (0.75'-1.0').						
	2											
	3											
	4											
	5											
						TOTAL DEPTH 1.0' (0.3m)						
							cementation at 1.0 exceeded capacity of Case 580C backhoe					

SURFACE ELEVATION: 5480' (1670m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT WR-P-12

LOGS OF TEST PITS WR-P-11 AND WR-P-12
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANSO


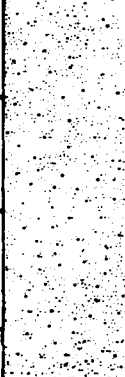
FIGURE
7-14

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0		SM	loose	SILTY SAND, light brown, fine to coarse, poorly graded, slightly moist, angular, calcareous; some nonplastic silt; trace fine gravel.		8	62	30		NP
	1										
	2		CL	stiff	SANDY CLAY, light brown, slightly moist, medium plastic, calcareous; some fine to medium poorly graded sand; stage II caliche (1.5'-2.5').						
	3										
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5300' (1615m)
SURFICIAL GEOLOGIC UNIT: A1

LOG OF TEST PIT WR-P-13

	0		SM	loose	SILTY SAND, light brown, fine to coarse, poorly graded, moist, angular, calcareous; trace fine gravel; stage III caliche (2.0'-3.5').		7	61	32		
	1										
	2			dense							
	3										
	4				TOTAL DEPTH 3.5' (1.1m)	cementation at 3.5' exceeded capacity of Case 580C backhoe					
5											

SURFACE ELEVATION: 5420' (1652m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT WR-P-14

LOGS OF TEST PITS WR-P-13 AND WR-P-14
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
7-15

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0				SANDY SILT, brown, moist, nonplastic, calcareous; some fine to coarse poorly graded sand; trace fine gravel.						
	1		ML	soft			8	33	59		NP
	2										
	3		SM	medium dense	GRAVELLY SAND, white, fine to coarse, poorly graded, dry, subangular, calcareous; some fine subangular to angular gravel; stage III caliche (2.0'-3.0').						
	4		GP	dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, dry, subangular to angular, calcareous; some fine to coarse sand.						
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5470' (1667m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT WR-P-15

	0				CLAY, brown, moist, highly plastic, calcareous; stage III caliche (1.0'-5.0').						
	1										
	2										
	3		CH	firm							
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5355' (1632m)
SURFICIAL GEOLOGIC UNIT: A2o

LOG OF TEST PIT WR-P-16

LOGS OF TEST PITS WR-P-15 AND WR-P-16
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

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DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
7-16

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0		ML	firm	SANDY SILT, brown, moist, nonplastic, calcareous; some fine to coarse sand; little fine gravel.		18	24	58	23	2
	1		GP	medium dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; little fine to coarse sand; stage I caliche (1.0'-2.0').						
	2										
	3										
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5485' (1672m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT WR-P-17

	0		SM	loose	GRAVELLY SAND, brown, fine to coarse, poorly graded, moist, angular, calcareous; some fine gravel; occasional cobbles to 5" size; stage IV caliche (1.25'-1.50').						
	1				TOTAL DEPTH 1.5' (0.5m)						
	2					cementation at 1.5' exceeded capacity of Case 580C backhoe					
	3										
	4										
	5										

SURFACE ELEVATION: 5720' (1743m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT WR-P-18

LOGS OF TEST PITS WR-P-17 AND WR-P-18
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FIGURE
7-17

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS					
							GR	SA	FI	LL	PI	
	0											
	1		SM	loose	SILTY SAND, light brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; Sandy Gravel layer (2.0'-2.5').		15	45	40			
	2		GP	medium dense								
	3		SM	medium dense								
	4											
	5											
					TOTAL DEPTH 5.0' (1.5m)							

SURFACE ELEVATION: 5530' (1686m)
SURFICIAL GEOLOGIC UNIT: A4a

LOG OF TEST PIT WR-P-19

	0				CLAY, brown, moist, highly plastic, calcareous.							
	1											
	2											
	3		CH	stiff								
	4											
	5											
					TOTAL DEPTH 5.0' (1.5m)							

SURFACE ELEVATION: 5480' (1664m)
SURFICIAL GEOLOGIC UNIT: A4a

LOG OF TEST PIT WR-P-20

LOGS OF TEST PITS WR-P-19 AND WR-P-20
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
7-18

FUGRO NATIONAL, INC.

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0		SM	loose	SILTY SAND, brown, fine to coarse, poorly graded, moist, angular, calcareous; some fine to coarse gravel.		31	34	35		
	1		GP	very dense	SANDY GRAVEL, white, fine to coarse, poorly graded, dry, angular to sub-angular, calcareous; some fine to coarse sand; occasional cobbles to 5" size, stage IX caliche (1.0'-2.0').						
	2				TOTAL DEPTH 2.0' (0.6m)	cementation at 2.0' exceeded capacity of Case 580C backhoe					
	3										
	4										
	5										

SURFACE ELEVATION: 5500' (1676m)
SURFICIAL GEOLOGIC UNIT: A51

LOG OF TEST PIT WR-P-21

	0			stiff	CLAY, light brown, slightly moist, slightly plastic, calcareous; trace fine sand.					35	13
	1		CL	very stiff	SANDY CLAY, light brown, slightly moist, slightly plastic, calcareous; some fine to medium poorly graded sand.						
	2										
	3										
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5440' (1658m)
SURFICIAL GEOLOGIC UNIT: A40

LOG OF TEST PIT WR-P-22

LOGS OF TEST PITS WR-P-21 AND WR-P-22
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FIGURE
7-19

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SECTION 8.0
SURFICIAL SAMPLE LOGS

EXPLANATIONS OF SURFICIAL SAMPLE LOGS

Finalized logs of the surficial samples are presented in this section. The explanations provided here are to serve as general guidelines to reading the logs.

A. Designations - Surficial samples are identified as follows:

SE-CS-1

SE - abbreviation for the site (e.g., SE - Snake East)
CS - abbreviation for surficial sample
1 - number of activity

B. Ground Surface Elevation - Indicated elevations on the logs are estimated from topographic maps of the study area within an accuracy of half the contour interval.

C. Surficial Geologic Unit - Indicates the surficial geologic unit in which the activity is located.

D. Depth - Indicates depth interval for which soil description is given.

E. USCS - Unified Soil Classification Symbol; see Table 6-1 of Section 6.0, "Boring Logs", for details of USCS.

F. Soil Description - Soil is described based on field visual descriptions and/or laboratory test results. See Section 6.0, "Boring Logs", for procedures of soil description.

G. Sieve Analysis, LL and PI - These are from results of laboratory tests. See Section 6.0, "Boring Logs", for explanation.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
WR-CS-1	5838 (1718)	A5y	0.0-2.0 (0.0-0.6)	CL	SANDY CLAY, brown, slightly plastic, calcareous; some fine to coarse sand.					
WR-CS-3	6000 (1829)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular, calcareous; some slightly plastic silt, some fine to coarse gravel.	30	35	35		
WR-CS-5	5400 (1648)	A4e	0.0-2.0 (0.0-0.6)	CL	SANDY CLAY, brown, slightly plastic, calcareous; little fine to medium sand.					
WR-CS-6	5360 (1634)	A1	0.0-2.0 (0.0-0.6)	CH	CLAY, red brown, highly plastic, calcareous; trace fine sand.					
WR-CS-7	5380 (1634)	A4e	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to medium, poorly graded, angular, calcareous; some slightly plastic silt.	1	67	32	35	10
WR-CS-11	5356 (1633)	A4e	0.0-2.0 (0.0-0.6)	CL	SILTY CLAY, brown, medium plastic, calcareous; trace fine sand.					
WR-CS-14	5560 (1695)	A5i	0.0-0.75 (0.0-0.2)	SM	SILTY SAND, brown, fine to medium, poorly graded, angular, calcareous; some silt; trace fine gravel.					
			0.75-2.0 (0.2-0.6)	GP	SANDY GRAVEL, white, fine to coarse, poorly graded, angular to subangular, calcareous; some fine to coarse sand, occasional cobbles to 8" size.					
WR-CS-15	5472 (1668)	A1	0.0-2.0 (0.0-0.6)	ML	SANDY SILT, light brown, nonplastic, calcareous; some fine to medium sand.	1	24	75		NP
WR-CS-16	5470 (1667)	A4e	0.0-1.0 (0.0-0.3)	CL	SANDY CLAY, brown, slightly plastic, calcareous; little fine to medium sand.					
			1.0-2.0 (0.3-0.6)	ML	SANDY SILT, white, nonplastic, calcareous; some fine to medium sand.					
WR-CS-17	5460 (1664)	A4e	0.0-1.25 (0.0-0.4)	SM	SILTY SAND, brown, fine to medium, poorly graded, calcareous; some silt.					
			1.25-2.0 (0.4-0.6)	CL	SANDY CLAY, light brown, slightly plastic, calcareous; little fine sand.					
WR-CS-20	5460 (1670)	A4e	0.0-2.0 (0.0-0.6)	CL	SILTY CLAY, brown to white, slightly plastic, calcareous; little fine sand; stage III caliche.					
WR-CS-23	5360 (1634)	A4e	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, angular to subangular, calcareous; some silt; trace fine gravel.					

LOGS OF SURFICIAL SOIL SAMPLES
VERIFICATION SITE,
WHITE RIVER COP, NEVADA

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FIGURE
8-1
1 OF 3

GRO NATIONAL, INC.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
WR-CS-24	5300 (1615)	A1	0.0-2.0 (0.0-0.6)	CH	CLAY, gray, highly plastic, cal- careous.				98	68
WR-CS-26	5310 (1618)	A4e	0.0-2.0 (0.0-0.6)	CL	SILTY CLAY, brown gray, medium plastic, calcareous; little fine to medium sand.					
WR-CS-27	5312 (1619)	A4e	0.0-2.0 (0.0-0.6)	CH	SILTY CLAY, light brown, highly plastic, calcareous; trace fine sand.				69	40
WR-CS-28	5385 (1641)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown to white, fine to coarse, poorly graded, angular, calcareous; trace silt; trace fine gravel; stage IX caliche (1.85'-2.0').					
WR-CS-32	5230 (1584)	A4e	0.0-0.75 (0.0-0.2)	ML	SANDY SILT, brown, slightly plastic, calcareous; little fine sand.					
			0.75-2.0 (0.2-0.6)	SP-SM	GRAVELLY SAND, light brown, fine to coarse, poorly graded, angular to subangular, calcareous; little fine gravel; trace silt.					
WR-CS-34	5285 (1605)	A4e	0.0-1.5 (0.0-0.5)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular to sub- angular, calcareous; trace silt.					
			1.5-2.0 (0.5-0.8)	SP-SM	GRAVELLY SAND, light brown, fine to coarse, poorly graded, angular to subangular, calcareous; some fine to coarse gravel; stage IX-III caliche (1.5'-2.0').					
WR-CS-35	5210 (1588)	A4e	0.0-2.0 (0.0-0.6)	SC	CLAYEY SAND, brown to white, fine to coarse, poorly graded, calcareous; some slightly plastic clay.					
WR-CS-36	5210 (1588)	A4e	0.0-1.0 (0.0-0.3)	CL	SANDY CLAY, brown, slightly plastic, calcareous; some fine to medium sand.					
WR-CS-37	5360 (1633)	A4e	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown to white, fine to medium, poorly graded, calcareous; little to some silt; stage III caliche (1.5'-2.0').					
WR-CS-39	5270 (1608)	A5y	0.0-2.0 (0.0-0.6)	SC	CLAYEY SAND, brown to white, fine to coarse, poorly graded, angular to subangular, calcareous; some slightly plastic clay; stage III caliche (1.5'- 2.0').					
WR-CS-40	5328 (1624)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown to white, fine to coarse, poorly graded, angular to subangular, calcareous; some silt; trace fine gravel; stage III caliche (1.5'-2.0').	7	48	45		

LOGS OF SURFICIAL SOIL SAMPLES
VERIFICATION SITE,
WHITE RIVER COP, NEVADA

MX SITING INVESTIGATION
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FIGURE
8-1
2 OF 3

UGRO NATIONAL, INC.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
WR-CS-42	5440 (1658)	A5y	0.0-2.0 (0.0-0.6)	ML	SANDY SILT, brown to white, nonplastic, calcareous; some fine sand.	0	35	65		NP
WR-CS-44	5580 (1695)	A5i	0.0-2.0 (0.0-0.6)	CL	SANDY CLAY, brown to white, slightly plastic, calcareous; some fine to coarse sand; trace fine gravel; stage IX (1.5'-2.0').					
WR-CS-47	5540 (1689)	A5i	0.0-1.75 (0.0-0.5)	CL	SANDY CLAY, brown, slightly plastic, calcareous; some fine to medium sand; trace fine gravel.					
			1.75-2.0 (0.5-0.6)	SP-SM	GRAVELLY SAND, white, fine to coarse, poorly graded, subangular to angular, calcareous; some fine to coarse gravel; stage IX caliche (1.75'-2.0').					
WR-CS-48	5290 (1612)	A5y	0.0-2.0 (0.0-0.6)	ML	SANDY SILT, brown, slightly plastic, calcareous; little fine sand.	0	18	81	31	7
WR-CS-50	5244 (1598)	A4e	0.0-2.0 (0.0-0.6)	SC	CLAYEY SAND, brown to white, fine to medium, poorly graded, calcareous; little slightly plastic clay; stage IX caliche (1.75'-2.0').					
WR-CS-51	5230 (1594)	A4e	0.0-1.0 (0.0-0.3)	SM	SILTY SAND, brown, fine to medium, poorly graded, calcareous; little silt.					
			1.0-2.0 (0.3-0.6)	CL	SILTY CLAY, light brown, slightly plastic, calcareous; trace fine to medium sand.					

LOGS OF SURFICIAL SOIL SAMPLES
VERIFICATION SITE,
WHITE RIVER COP, NEVADA

MX SITING INVESTIGATION
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FIGURE
8-1
3 OF 3

FUGRO NATIONAL, INC.

SECTION 9.0
LABORATORY TEST RESULTS

EXPLANATIONS OF LABORATORY TEST RESULTS

Laboratory test results are presented in this section. Table 9-1 contains a summary of laboratory test results. This table contains results of sieve analysis; plasticity data; in-situ dry unit weight, moisture content, degree of saturation, and void ratio for drive and Pitcher samples; results of compaction tests; and specific gravity of solids. Other tests such as triaxial compression, unconfined compression, direct shear, consolidation, chemical, and California Bearing Ratio (CBR) are indicated on the table. Tables 9-2 through 9-6 and Figures 9-1 through 9-3 present results of triaxial compression, unconfined compression, direct shear, consolidation, chemical, and CBR tests.

All tests were performed in general accordance with the American Society for Testing and Materials (ASTM) procedures. The following table presents the ASTM designations for the tests performed during the investigation.

<u>Type of Test</u>	<u>ASTM Designations</u>
Particle Size Analysis	D 422-63
Liquid Limit	D 423-66
Plastic Limit	D 424-59
Unit Weight	D 2937-71
Moisture Content	D 2216-71
Compaction	D 1557-70
Specific Gravity of Solids	D 854-58
Triaxial	D 2850-70
Unconfined Compression	D 2166-66
Direct Shear	D 3080-72
Consolidation	D 2435-70
Test for Alkalinity (pH)	D 1067-70
Water Soluble Sodium	D 1428-64
Water Soluble Chloride	D 512-67
Water Soluble Sulphate	D 516-68
Water Soluble Calcium	D 511-72
Calcium Carbonate	D 1126-67
California Bearing Ratio (CBR)	D 1883-73

Explanation for the tables and figures presented in this section are as follows.

- A. Activity Number - Boring, trench, test pit, or surficial sample designation.
- B. Sample Number - Prefix indicates the type of sample; explanation is at the bottom of the table.
- C. Sample Interval - This is the depth range measured from ground surface over which the sample was obtained.
- D. Percent Finer by Weight - Presents the results of laboratory particle size analysis (ASTM D 422-63) performed on representative soil samples at the depth indicated. The numbers represent the percent (by dry weight) of the total sample weight passing through each sieve size indicated.
- E. Atterberg Limits (ASTM D 423-66 and D 424-59)
 - LL - Liquid Limit, the water content (as percent of soil dry weight) corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil (ASTM D 423-66).
 - PL - Plastic Limit, the water content corresponding to an arbitrary limit between the plastic and the semisolid state of consistency of a soil (ASTM D 424-59).
 - PI - Plasticity Index, numerical difference between the liquid limit (LL) and the plastic limit (PL) indicating the range of moisture content within which a soil-water mixture is plastic.
 - NP - Nonplastic.
- F. USCS - Unified Soil Classification Symbols are given here; see Table 6.1 in Section 6.0, "Boring Logs", for complete details of USCS system.

G. In Situ - Presents results of tests on drive and Pitcher samples.

Dry Unit Weight - indicates dry unit weight of soil determined as per ASTM D 2937-71

Moisture Content - weight of water reported in percent of dry weight of soil sample (ASTM D 2216-71)

Saturation - the degree of saturation in a soil sample is defined as the ratio (in percent) of the volume of water to the volume of all voids in the soil

Void Ratio - the numerical ratio of the volume of voids to the volume of solids in a soil specimen

H. Compacted - Indicates results of laboratory maximum dry density and optimum moisture content test as per ASTM D 1557-70.

I. Specific Gravity of Solids (ASTM D 854-58) - Indicates the ratio of (1) the weight in air of a given volume of soil solids at a stated temperature, to (2) the weight in air of an equal volume of distilled water at a stated temperature.

J. Triaxial - The triaxial compression tests were performed in accordance with the procedures of ASTM D 2850-70. The following explanations and definitions apply.

Triaxial Compression Test - a cylindrical specimen of soil is surrounded by a fluid in a pressure chamber and subjected to an isotropic pressure. An additional compressive load is then applied, directed along the axis of the specimen called the axial load.

Consolidated-Drained (CD) Test - a triaxial compression test in which the soil was first consolidated under an all-around confining stress (test chamber pressure), and was then compressed (and hence sheared) by increasing the

vertical stress. Drained indicates that excess pore water pressure generated by strains are permitted to dissipate by the free movement of pore water during consolidation and compression.

Consolidated-Undrained (CU) Test - a triaxial compression test in which essentially complete consolidation under the confining (chamber) pressure is followed by a shear test at constant water content.

Confining Pressure (σ_3) - the isotropic chamber pressure applied to the soil specimen during consolidation and compression.

Maximum Deviator Stress ($\sigma_1 - \sigma_3$) - the difference between the major and minor principal stresses in the specimen at failure. The major principal stress on the specimen is equal to the unit axial load plus the chamber pressure and the minor principal stress on the specimen is equal to the chamber pressure.

Strain Rate - axial strain, ϵ , at a given stress level is defined as the ratio of the change in length (ΔL) of the specimen to the original length of the specimen (L_0). The rate of strain was controlled during the test so that this ratio increased at equal increments for each minute of testing.

Back Pressure - pressure in excess of atmospheric applied to the pore water of a soil sample. Back pressure is usually applied to (1) increase saturation of the sample, or (2) simulate the actual in-situ pressure regime.

- K. Unconfined Compression - Test procedures were as described in ASTM D 2166-66. Unconfined compressive strength is defined as the load per unit area at which an unconfined prismatic or cylindrical specimen of soil will fail in a simple compression test. In these methods, unconfined compressive strength is taken as the maximum load attained per unit area or the load per unit area at 20 percent axial strain, whichever occurred first during the performance of a test.

- L. Direct Shear - The procedures of ASTM D 3080-72 were followed for direct shear testing. In this test, soil under an applied normal load is stressed to failure by moving one section of the soil container (shear box) relative to the other section. Normal stress is the value of load per unit area acting perpendicular to the plane of shearing. Maximum shear strength is defined as the maximum resistance (ksf) of a soil to shearing (tangential) stresses.
- M. Consolidation (ASTM D 2435-70) - A consolidation test is a test in which a cylindrical soil specimen is laterally confined in a ring and compressed between porous plates. The term "consolidation", as used here, indicates the gradual reduction in volume of the soil mass resulting from an increase in compressive stress (axial load per unit area).
- N. Chemical - The chemical tests performed on soil samples included: pH; water soluble sodium, chloride, sulphate, calcium; and calcium carbonate content. pH is an index of the acidity or alkalinity of a soil in terms of the logarithm of the reciprocal of the hydrogen ion concentration. ASTM test procedure designations for these chemical tests are included in the table at the beginning of the "Explanation of Laboratory Test Results".
- O. CBR - California Bearing Ratio (CBR) is the ratio (in percent) of the resistance to penetration developed by a subgrade soil to that developed by a standard crushed-rock

base material. The procedures for conducting a CBR test were as outlined in ASTM D 1883-73. The materials tested for CBR were also analyzed for particle size distribution (ASTM D 422-63) and compaction characteristics (ASTM D 1557-70). The term "percentage of maximum density" indicates the ratio (as a percentage) of the compacted sample dry unit weight to maximum dry density obtained in the laboratory from ASTM D 1557-70, "Moisture-Density Relations of Soils Using 10-pound (4.5 kg) Hammer and 18-inch (457 mm) Drop".

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT									
				STANDARD SIEVE OPENING						U S STAND			
				BLDRS.	COBBLES		GRAVEL			SAND			
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	
WR-B-1	P-1	0.8-1.6	0.24-0.49								100	96	
	P-2	4.9-5.7	1.49-1.74								100	95	
	D-3	7.5-8.2	2.29-2.50										
	P-4	10.0-10.9	3.05-3.32										
	P-4	10.9-11.8	3.32-3.60										
	P-5	15.9-16.5	4.85-5.88										
	P-5	16.5-17.2	5.03-5.24										
	P-5	17.2-17.9	5.24-5.46										
	P-6	20.0-20.8	6.10-6.34										
	P-7	25.0-25.9	7.62-7.89								100	97	
	P-8	30.7-31.4	9.36-9.57										
	P-9	40.9-41.8	12.47-12.74										
	P-10	50.0-50.4	15.24-15.36							100	99	95	
	P-10	50.4-51.2	15.36-15.61										
	P-11	60.0-60.9	18.29-18.56										
	P-12	70.8-71.6	21.58-21.82										
	P-13	80.8-81.3	24.63-24.78										
P-14	98.0-98.8	29.87-30.11											
P-15	121.4-122.1	37.00-37.22											
P-16	140.5-141.4	42.82-43.10											
P-17	160.8-161.6	49.01-49.26									100		
WR-B-2	D-1	0.2-0.9	0.06-0.27					100	83	80	68	58	
	D-2	3.5-4.0	1.07-1.22					100	90	68	54	44	
	D-4	7.3-7.9	2.19-2.41										
	D-5	10.8-11.4	3.29-3.47										
	D-6	15.2-15.9	4.63-4.85						100	86	59	41	
	D-8	25.0-25.4	7.62-7.74										
	D-9	30.0-30.6	9.14-9.33					100	66	49	43	37	
	D-10	40.0-40.3	12.19-12.28										
	D-11	50.0-51.0	15.24-15.54					100	87	70	60	51	
	D-13	79.0-79.3	24.08-24.17				100	57	49	40	34	28	
	D-14	100.0-100.5	30.48-30.63										
	D-15	114.2-114.9	34.81-35.02						100	93	84	69	
	D-16	135.0-135.4	41.15-41.27					100	80	64	48	40	
	D-17	160.0-160.3	48.77-48.86					100	88	68	51	37	
	WR-B-3	P-1	0.8-1.6	0.24-0.49								100	97
		D-2	4.2-4.9	1.28-1.49							100	99	96
		D-3	7.3-7.9	2.23-2.41									
P-4		10.0-10.8	3.05-3.29										
P-4		10.8-11.3	3.29-3.44								100	99	
P-5		15.0-15.9	4.57-4.85										

NOTES:

(a) Sample types

SS - Standard split spoon

P - Pitcher

D - Fugro Drive

B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

CHECKED BY _____

PER BY WEIGHT							ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS
U S STANDARD SIEVE NO					PARTICLE SIZE (mm)						DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	
SAND			SILT OR CLAY		(pcf)	(kg/m ³)					(pcf)	(kg m ³)							
4	10	40	100	200	.005	.001	LL	PL	PI										
100	96	2	45	34						SM	92.6	1483	10.7	35.2	0.82				
100	95	51	16	11						SP-SM	99.7	1597	5.3	20.8	0.69				
										SM	96.6	1548	13.0	47.2	0.74				
										CL	92.2	1477	21.0	68.9	0.83				
							43	22	21	CL	83.2	1333	21.7	57.1	1.03				
										ML	85.9	1376	24.4	68.6	0.96				
							45	28	17	ML	93.8	1503	17.1	58.0	0.80				2.63
										ML	92.2	1477	29.3	95.7	0.83				
							64	34	30	MH	77.4	1240	33.6	77.2	1.18				
100	97	87	74	69						MH	74.6	1195	42.6	91.4	26				
										MH	80.6	1291	38.2	94.6	1.09				
										MH	76.1	1219	37.0	82.2	1.22				
99	95	74	57	52			59	40	19	MH									
										MH	76.8	1230	39.9	90.1	1.19				
										MH	89.9	1440	30.1	92.8	0.87				
										ML	93.2	1493	23.7	79.0	0.81				
										ML	92.7	1485	26.1	86.2	0.82				
							45	30	15	ML	79.2	1269	43.8	100.0	1.13				
										ML	85.1	1363	33.7	92.7	1.00				
										SP	93.4	1496	19.8	66.6	0.81				
	100	99	98	91						ML	97.9	1568	23.7	88.7	0.72				
68	58	48	40	33						SM	90.8	1455	12.9	40.7	0.86				
54	44	33	24	18						GM	101.1	1620	5.9	24.2	0.67				
										GM	121.4	1945	2.9	20.8	0.39				
										GM	115.2	1846	5.2	30.4	0.46				
59	41	26	17	12						SP-SM	115.4	1849	12.1	71.1	0.46				
										SP-SM	116.2	1862	14.9	89.7	0.45				
43	37	27	15	15						GM	112.6	1804	17.2	93.4	0.50				
										GM	112.6	1804	17.2	93.4	0.50				
60	51	43	38	33						GM	112.6	1804	17.2	93.4	0.50				
34	28	15	13	13						GM	112.6	1804	17.2	93.4	0.50				
										GM	112.6	1804	17.2	93.4	0.50				
84	69	42	30	26						SM	129.3	2071	7.6	67.2	0.30				
48	40	32	27	25						GM	126.4	2025	8.5	68.6	0.33				
51	37	24	19	16						GM	133.9	2145	8.9	92.3	0.26				
100	97		44	30						SM	74.0	1185	21.7	46.0	1.28				
99	96	93	89	86						CH	84.2	1349	15.3	41.2	1.00				
							54	29	25	CH	85.3	1367	16.0	44.3	0.98				
										CH	88.0	1410	16.9	49.9	0.91				
100	99	97	82	60			39		16	CL									
							37	23	14	CL	91.2	1461	27.8	88.6	0.85				

ERG (b)	USCS (c)	IN-SITU					COMPACTED		SPECIFIC GRAVITY OF SOLIDS	TRIAxIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	COR	
		DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY									OPTIMUM MOISTURE (%)
		(pcf)	(kg/m ³)				(pcf)	(kg/m ³)								
PI																
	SM	92.6	1483	10.7	35.2	0.82										
	SP-SM	99.7	1597	5.3	20.8	0.69										
	SM	96.6	1548	13.0	47.2	0.74								*		
	CL	92.2	1477	21.0	68.9	0.83					*					
21	CL	83.2	1333	21.7	57.1	1.03										
	ML	85.9	1376	24.4	68.6	0.96				*						
17	ML	93.8	1503	17.1	58.0	0.80			2.63	*						
	ML	92.2	1477	29.3	95.7	0.83				*						
30	MH	77.4	1240	33.6	77.2	1.18							*			
	MH	74.6	1195	42.6	91.4	1.26								*		
	MH	80.6	1291	38.2	94.6	1.09										
	MH	76.1	1219	37.0	82.2	1.22										
19	MH															
	MH	76.8	1230	39.9	90.1	1.19										
	MH	89.9	1440	30.1	92.8	0.87								*		
	ML	93.2	1493	23.7	79.0	0.81										
	ML	92.7	1485	26.1	86.2	0.82										
15	ML	79.2	1269	43.8	100.0	1.13										
	ML	85.1	1363	33.7	92.7	1.00								*		
	SP	93.4	1496	19.8	66.6	0.81										
	ML	97.9	1568	23.7	88.7	0.72								*		
	SM	90.8	1455	12.9	40.7	0.86										
	GM	101.1	1620	5.9	24.2	0.67										
	GM	121.4	1945	2.9	20.8	0.39										
	GM	115.2	1846	5.2	30.4	0.46										
	SP-SM	115.4	1849	12.1	71.1	0.46										
	SP-SM	116.2	1862	14.9	89.7	0.45										
	GM	112.6	1804	17.2	93.4	0.50					*					
	GM	112.6	2134	10.8	100.0	0.27										
	GM	112.6	1884	15.5	96.7	0.43										
	GM	115.9	2177	9.0	100.0	0.24										
	GM	128.0	2051	9.9	85.2	0.32										
	SM	129.3	2071	7.6	67.2	0.30										
	GM	126.4	2025	8.5	68.6	0.33										
	GM	133.9	2145	8.9	92.3	0.26										
	SM	74.0	1185	21.7	46.0	1.28										
	CH	84.2	1349	15.3	41.2	1.00										
25	CH	85.3	1367	16.0	44.3	0.98										
	CH	88.0	1410	16.9	49.9	0.91										
16	CL															
14	CL	91.2	1461	27.8	88.6	0.85					*					

SUMMARY OF LABORATORY TEST RESULTS
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

ON SITE INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANSO

TABLE
8-1
1 OF 3

FUGRO NATIONAL INC.

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT										
				STANDARD SIEVE OPENING						U S STANDARD				
		FEET	METERS	BLDRS	COBBLES		GRAVEL			SAND				
24"	12"			6"	3"	1½"	3/4"	3/8"	4	10	40			
WR-B-3	P-6	20.0-20.8	6.10-6.34											
	P-7	25.0-25.4	7.62-7.74											
	P-7	25.4-26.2	7.74-7.99											
	P-8	30.0-30.7	9.14-9.36											
	P-9	40.9-41.8	12.47-12.74						100	97	96	91	79	
	P-10	50.0-50.8	15.24-15.48								100	99	89	
	P-11	60.0-60.9	18.29-18.56											
	P-12	70.0-70.8	21.34-21.58											
	P-13	80.8-81.6	24.63-24.87							100	96	88	47	
	P-14	90.0-90.8	27.43-27.68											
	P-15	100.9-101.8	30.75-31.02											
	P-16	110.2-111.0	33.59-33.83											
	P-17	124.9-125.8	38.07-38.34											
	P-18	142.8-143.6	43.53-43.77											
	P-19	160.8-161.7	49.01-49.29											
	WR-B-4	P-1	0.8-1.7	0.24-0.76								100	96	72
		P-2	4.5-5.3	1.37-1.62						100	99	96	80	50
		P-3	7.9-8.6	2.41-2.62										
		P-4	10.0-10.8	3.05-3.29										
P-5		15.0-15.6	4.57-4.75											
P-5		15.6-16.2	4.75-4.94							100	97	78	27	
P-6		20.8-21.5	6.34-6.55											
D-7		25.2-25.9	7.68-7.89											
D-8		30.2-30.9	9.20-9.42								100	98	89	
P-9		36.0-36.7	10.97-11.19								100	97	61	
P-10		41.4-42.3	12.62-12.89											
D-11		50.0-50.3	15.24-15.33						100	99	85	57	17	
P-12		60.9-61.8	18.56-18.84											
D-13		70.2-70.9	21.40-21.61						100	96	88	64	24	
P-14		80.7-81.4	24.59-24.81											
P-15		90.8-91.7	27.68-27.95											
D-16		100.2-100.9	30.54-30.75						100	95	81	54	20	
P-17		109.9-110.7	33.50-33.74											
P-18		125.0-125.8	38.10-38.34											
P-19		137.6-138.4	41.94-42.18									100	94	
P-20		160.4-161.2	48.89-49.13								100	99	89	
WR-B-5	P-1	0.1-0.7	0.03-0.21						100	92	84	77	7	
	D-2	3.0-3.5	0.91-1.07						100	99	94	83	64	
	D-3	5.2-5.9	1.58-1.80					100	93	80	62	37	2	
	D-5	10.5-1.07	3.20-3.26					100	89	58	43	34	1	
	D-6	14.5-14.8	4.42-4.51											

NOTES:

(a) Sample types

SS - Standard split spoon

P - Pitcher

D - Fugro Drive

B.b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed
and results are included in this report

GRAIN SIZE DISTRIBUTION BY WEIGHT							ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED		SPECIFIC GRAVITY	
U S STANDARD SIEVE NO				PARTICLE SIZE (mm)			LL	PL	PI		DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY			OPTIMUM MOISTURE (%)
SAND				SILT OR CLAY							(pcf)	(kg/m ³)				(pcf)	(kg/m ³)		
4	10	40	100	200	.005	.001													
							82	35	47	CH	77.7	1245	26.5	61.2	1.17				
										CH	76.5	1226	35.1	78.7	1.20				
										CH	68.2	1093	45.1	82.8	1.47				
										CL	94.5	1514	22.1	76.1	0.78				
96	91	78	53	28						SM	91.3	1463	27.1	86.6	0.85				
100	99	86	76	69						CL									
										CL	76.2	1221	43.0	96.0	1.21				
										CL	81.7	1309	40.5	100.0	1.06				
96	88	47	32	27						SC	108.6	1740	15.7	76.7	0.55				
										CL	94.6	1515	27.2	94.2	0.78				
										CL	89.9	1440	31.2	96.4	0.87				
										CL	110.8	1775	15.7	81.1	0.52				
							38	24	14	CL	103.7	1661	21.1	91.2	0.62				
										CL	95.4	1528	26.9	94.7	0.77				
							59	26	33	CL	82.6	1323	39.5	100.0	1.04				
100	96	72	48	37						SC	83.1	1331	23.9	62.7	1.03				
96	80	58	47	40						SC	94.4	1512	16.9	58.1	0.79				
							46	28	18	ML	85.6	1371	33.6	93.7	0.97				
										SM	90.1	1443	30.3	94.1	0.87				
										SP-SM									
97	78	27	15	8						SP-SM	107.4	1721	13.1	62.2	0.57				
										SP-SM	108.4	1737	19.3	93.4	0.56				
										SP-SM	113.3	1815	11.4	63.1	0.49				
100	98	88	58	35						SM	100.4	1608	23.9	95.1	0.68				
100	97	65	38	24	4	3			NP	SM	78.4	1256	36.2	84.9	1.15				
										CL	98.1	1572	32.1	100.0	0.72				
85	57	12	5	4						SW	110.5	1770	18.2	93.6	0.52				
							35	24	11	CL	87.4	1400	44.7	100.0	0.93				
88	64	24	8	7						SP-SM	114.2	1829	14.8	84.1	0.48				
										CL	98.7	1581	22.6	86.2	0.71				
										CL	101.5	1626	23.0	94.1	0.66				
81	54	26	8	6						SP-SM	114.9	1841	15.7	90.6	0.47				
										CL	84.7	1357	34.5	94.3	0.99				
										CL	89.3	1431	34.2	104.1	0.89				
	100	99	83	71			44	24	20	CL	86.0	1378	35.2	99.2	0.96				
100	99	88	67	42						SC	107.1	1716	17.6	82.8	0.57				
84	77	70	62	49						SM	90.9	1456	12.8	40.4	0.85				
94	83	60	46	38						SM									
62	37	20	14	12						SP-SM	126.7	2030	6.2	50.3	0.33				
43	34	19	14	13						GC	124.8	1999	7.9	61.3	0.35				
										GC	127.8	2047	9.9	84.0	0.32				

RG (b)	USCS (c)	IN-SITU					COMPACTED		SPECIFIC GRAVITY OF SOLIDS	TRIAxIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR	
		DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY									OPTIMUM MOISTURE (%)
		(pcf)	(kg/m ³)				(pcf)	(kg. m ³)								
PI																
	CH	77.7	1245	26.5	61.2	1.17										
47	CH	76.5	1226	35.1	78.7	1.20										
	CH	68.2	1093	45.1	82.8	1.47							*			
	CL	94.5	1514	22.1	76.1	0.78										
	SM	91.3	1463	27.1	86.6	0.85										
	CL															
	CL	76.2	1221	43.0	96.0	1.21										
	CL	81.7	1309	40.5	100.0	1.06										
	SC	108.6	1740	15.7	76.7	0.55										
	CL	94.6	1515	27.2	94.2	0.78										
	CL	89.9	1440	31.2	96.4	0.87										
	CL	110.8	1775	15.7	81.1	0.52										
14	CL	103.7	1661	21.1	91.2	0.62										
	CL	95.4	1528	26.9	94.7	0.77										
33	CL	82.6	1323	39.5	100.0	1.04										
	SC	83.1	1331	23.9	62.7	1.03										
	SC	94.4	1512	16.9	58.1	0.79										
18	ML	85.6	1371	33.6	93.7	0.97					*					
	SM	90.1	1443	30.3	94.1	0.87										
	SP-SM											*				
	SP-SM	107.4	1721	13.1	62.2	0.57										
	SP-SM	108.4	1737	19.3	93.4	0.56										
	SP-SM	113.3	1815	11.4	63.1	0.49										
	SM	100.4	1608	23.9	95.1	0.68										
NP	SM	78.4	1256	36.2	84.9	1.15										
	CL	98.1	1572	32.1	100.0	0.72										
	SW	110.5	1770	18.2	93.6	0.52										
11	CL	87.4	1400	44.7	100.0	0.93										
	SP-SM	114.2	1829	14.8	84.1	0.48										
	CL	98.7	1581	22.6	86.2	0.71										
	CL	101.5	1626	23.0	94.1	0.66										
	SP-SM	114.9	1841	15.7	90.6	0.47										
	CL	84.7	1357	34.5	94.3	0.99										
	CL	89.3	1431	34.2	104.1	0.89										
20	CL	86.0	1378	35.2	99.2	0.96										
	SC	107.1	1716	17.6	82.8	0.57										
	SM	90.9	1456	12.8	40.4	0.85										
	SM															
	SP-SM	126.7	2030	6.2	50.3	0.33										
	GC	124.8	1999	7.9	61.3	0.35										
	GC	127.8	2047	9.9	84.0	0.32										

SUMMARY OF LABORATORY TEST RESULTS
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE SANSO

TABLE
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1 OF 3

FUGRO NATIONAL, INC.

AFV-01

3

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT									
				STANDARD SIEVE OPENING						U S STAND			
		FEET	METERS	BLDRS.	COBBLES		GRAVEL				SAND		
24"	12"			6"	3"	1½"	3/4"	3/8"	4	10			
	D-7	19.2-19.9	5.85-6.07					100	79	59	38	27	
	D-8	24.0-24.5	7.32-7.47										
	D-9	29.0-29.8	8.84-9.08					100	87	57	43	35	
	D-10	40.0-40.3	12.19-12.28				100	49	49	44	33	22	
	D-11	53.0-53.4	16.15-16.28										
WR-B-6	D-1	0.7-1.4	0.21-0.43						100	86	73	62	
	D-2	3.0-3.6	0.91-1.10						100	91	72	58	
	D-3	6.2-6.9	1.89-2.10					100	82	65	53	42	
	D-4	10.2-10.9	3.11-3.32										
	D-5	15.0-15.5	4.57-4.72						100	86	71	57	
	D-6	20.0-20.6	6.10-6.28						100	76	49	32	
	D-7	25.2-25.9	7.68-7.89										
	D-8	30.2-30.9	9.20-9.42					100	92	72	53	38	
	D-9	39.9-40.4	12.16-12.31						100	99	94	88	
	D-10	50.9-51.4	15.51-15.67										
	D-11	60.2-60.7	18.35-18.50					100	85	84	72	59	
	D-12	70.9-71.4	21.61-21.76										
	D-13	85.4-85.9	26.02-26.18						100	92	70	55	
	D-15	105.4-105.9	32.13-32.28										
	D-17	119.5-119.9	36.42-36.55										
	D-19	140.2-140.7	42.73-42.89										
	D-21	160.8-161.3	49.01-49.16						100	97	88	81	
WR-B-7	D-1	0.4-1.0	0.12-0.30						100	96	89	78	
	D-2	3.2-3.9	0.98-1.19							100	94	84	
	D-3	8.4-8.9	2.56-2.71							100	96	87	
	D-4	14.2-14.9	4.33-4.54								100	97	
	D-5	20.2-20.9	6.16-6.37										
	D-6	30.0-30.4	9.14-9.27										
	D-7	40.1-40.8	12.22-12.44								100	95	
	D-8	50.2-50.9	15.30-15.51										
WR-T-1	B-1	0.1-2.0	0.03-0.61					100	90	81	66	53	
WR-T-2	B-1	0.25-1.5	0.08-0.46				100	99	97	92	86	79	
	b-2	6.0-6.5	1.83-1.98				100	79	52	28	16	10	
WR-T-3	B-1	0.1-1.5	0.03-0.46							100	99	93	
	b-3	9.0-9.5	2.74-2.90										
WR-T-4	B-1	0.25-2.0	0.08-0.61					100	99	96	92	90	

NOTES:

(a) Sample types

SS - Standard split spoon

P - Pitcher

D - Fugro Drive

B, b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed
and results are included in this report

CHECKED BY _____ APPROVED BY _____

BY WEIGHT							ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS
U S STANDARD SIEVE NO.				PARTICLE SIZE (mm)							DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	
SAND				SILT OR CLAY							(pcf)	(kg/m ³)				(pcf)	(kg. m ³)		
4	10	40	100	200	.005	.001	LL	PL	PI										
38	27	21	18	17						GC	124.5	1994	11.2	86.0	0.35				
										GC	128.3	2055	10.9	93.6	0.31				
43	35	17	11	10						GP-GC	138.3	2216	9.5	76.8	0.33				
33	22	14	11	9						GP-GM	131.5	2107	7.2	69.3	0.28				
										GP-GM	117.3	1879	12.5	77.5	0.44				
73	62	46	35	26						SM	91.8	1471	17.9	58.1	0.84				
72	58	40	28	22						SM	98.2	1573	7.4	28.0	0.72				
53	42	27	16	11						SM	118.0	1890	7.6	48.2	0.43				
										SM	115.6	1852	11.6	68.6	0.46				
71	57	37	22	16						SM	115.4	1849	11.7	68.6	0.46				
49	32	12	6	5						GW-GM	110.7	1773	15.8	81.9	0.52				
										GP-GM	121.5	1946	11.2	78.3	0.39				
53	38	19	12	9						GP-GM	116.1	1860	8.9	53.6	0.45				
94	88	68	44	31						SM	105.3	1687	16.9	76.1	0.60				
										SM	99.6	1596	14.0	54.6	0.69				
72	59	37	22	17						SM	107.2	1717	16.8	79.4	0.57				
										SM	110.5	1770	11.6	59.6	0.53				
70	55	40	31	21						SM	107.0	1714	14.7	69.3	0.57				
										SM	116.8	1871	10.0	61.3	0.44				
										SM	115.3	1847	13.4	78.7	0.46				
										SP-SM	114.9	1841	11.2	65.1	0.47				
88	81	64	32	18						SM	113.0	1810	10.1	55.5	0.49				
89	78	54	34	20						SM	102.7	1645	12.1	51.2	0.64				
94	84	42	21	15						SM	103.4	1656	7.2	30.8	0.63				
96	87	54	37	28						SM	86.5	1386	14.5	41.2	0.95				
100	97	86	64	39						SM	90.9	1456	13.7	43.4	0.85				
										SM	80.2	1285	17.6	43.1	1.10				
										SM	108.8	1743	18.0	88.8	0.55				
100	95	72	52	42	16	4				SM	101.3	1623	20.3	82.6	0.66				
				67			42	35	7	ML	77.6	1243	37.1	85.5	1.17				
66	53	29	17	13						SM						126.0	2019	9.0	
86	79	62	51	42						SM						114.5	1834	14.0	
16	10	6	4	2						GP									
99	93	67	38	27						SM									
							48	25	23	CL									
92	90	84	67	55			24	23	1	ML						122.8	1967	11.3	2.62

PI	USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAxIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
		DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)							
		(pcf)	(kg/m ³)				(pcf)	(kg/m ³)								
	GC	124.5	1994	11.2	86.0	0.35										
	GC	128.3	2055	10.9	93.6	0.31										
	GP-GC	138.3	2216	9.5	76.8	0.33										
	GP-GM	131.5	2107	7.2	69.3	0.28										
	GP-GM	117.3	1879	12.5	77.5	0.44										
	SM	91.8	1471	17.9	58.1	0.84										
	SM	98.2	1573	7.4	28.0	0.72										
	SM	118.0	1890	7.6	48.2	0.43										
	SM	115.6	1852	11.6	68.6	0.46										
	SM	115.4	1849	11.7	68.6	0.46										
	GW-GM	110.7	1773	15.8	81.9	0.52										
	GP-GM	121.5	1946	11.2	78.3	0.39										
	GP-GM	116.1	1860	8.9	53.6	0.45										
	SM	105.3	1687	16.9	76.1	0.60										
	SM	99.6	1596	14.0	54.6	0.69										
	SM	107.2	1717	16.8	79.4	0.57						*				
	SM	110.5	1770	11.6	59.6	0.53										
	SM	107.0	1714	14.7	69.3	0.57										
	SM	116.8	1871	10.0	61.3	0.44										
	SM	115.3	1847	13.4	78.7	0.46										
	SP-SM	114.9	1841	11.2	65.1	0.47										
	SM	113.0	1810	10.1	55.5	0.49										
	SM	102.7	1645	12.1	51.2	0.64										
	SM	103.4	1656	7.2	30.8	0.63										
	SM	86.5	1386	14.5	41.2	0.95										
	SM	90.9	1456	13.7	43.4	0.85										
	SM	80.2	1285	17.6	43.1	1.10										
	SM	108.8	1743	18.0	88.8	0.55										
	SM	101.3	1623	20.3	82.6	0.66										
7	ML	77.6	1243	37.1	85.5	1.17										
	SM						126.0	2019	9.0							*
	SM						114.5	1834	14.0							*
	GP															
	SM															
23	CL															
1	ML						122.8	1967	11.3	2.62						*

SUMMARY OF LABORATORY TEST RESULTS
VERIFICATION SITE, WHITE RIVER COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAWSO

TABLE
9-1
3 OF 3

FUGRO NATIONAL INC.

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT								
				STANDARD SIEVE OPENING							U S STAN	
				BLORS.	COBBLES		GRAVEL			SA		
		FEET	METERS	24"	12"	8"	3"	1½"	3/4"	3/8"	4	10
WR-T-5	B-1	0.0-2.0	0.00-0.61						100	74	62	53
WR-T-6	B-1	0.75-2.0	0.23-0.61							100	98	96
WR-T-7	B-1	0.1-0.75	0.03-0.23						100	91	85	79
WR-T-8	B-1	0.5-2.0	0.15-0.61							100	99	94
WR-P-3	b-1	0.25-0.5	0.08-0.15					100	93	87	80	75
WR-P-6	b-1	0.25-2.0	0.08-0.61							100	99	96
WR-P-7	b-1	0.25-1.5	0.08-0.46						100	89	82	74
WR-P-8	b-1	0.25-1.0	0.08-0.30						100	98	96	94
WR-P-9	b-1	0.5-1.0	0.15-0.30							100	99	94
WR-P-11	B-1	1.0-2.0	0.30-0.61									100
WR-P-13	b-1	0.25-1.0	0.08-0.30						100	97	92	86
WR-P-14	b-1	0.25-1.25	0.08-0.38						100	95	93	87
WR-P-15	b-1	0.25-2.0	0.08-0.61						100	99	92	87
WR-P-16	b-1	0.25-1.0	0.08-0.30									
WR-P-17	b-1	0.25-1.0	0.08-0.30						100	92	82	76
WR-P-18	b-1	0.25-1.0	0.08-0.30									
WR-P-19	b-1	0.25-2.0	0.08-0.61						100	91	85	84
WR-P-20	b-1	0.25-1.5	0.08-0.46									
WR-P-21	b-1	0.25-1.0	0.08-0.30					100	83	79	69	59
WR-P-22	b-1	0.25-1.0	0.08-0.30									
WR-CS-3	b-1	0.25-1.0	0.08-0.30					100	84	76	70	63
WR-CS-7	b-1	0.25-1.0	0.08-0.30							100	99	94

NOTES:

(a) Sample types

SS - Standard split spoon

P - Pitcher

D - Fugro Drive

B, b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed
and results are included in this report

CHECKED BY _____ APPROVED BY _____

FINER BY WEIGHT								ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY
U S STANDARD SIEVE NO.						PARTICLE SIZE (mm)						DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	
SAND				SILT OR CLAY		(pcf)	(kg/m ³)										(pcf)	(kg/m ³)		
#/IN	4	10	40	100	200	.005	.001	LL	PL	PI										
74	62	53	45	39	32	7	3			NP	GM									
100	98	96	93	86	85			50	26	24	CH					110.0	1762	19.0		
20	85	79	73	64	49					NP	SM									
100	99	94	70	52	42			67	32	35	SC					104.7	1677	20.7		
77	80	75	68	61	54	14	7	27	19	8	CL									
100	99	96	65	32	19						SM									
20	82	74	67	57	46	11	5			NP	SM									
78	96	94	75	52	37						SM									
100	99	94	61	32	22						SM									
		100	97	80	64					NP	ML									
77	92	86	62	41	30					NP	SM									
75	93	87	68	46	32						SM									
20	92	87	80	72	59					NP	SM									
											CH									
2	82	76	70	65	58			23	21	2	ML									
											SM									
1	85	84	80	63	40						SM									
											CH									
20	69	59	48	42	35						SM									
								35	22	13	CL							2.		
3	70	63	50	41	35						SM									
10	99	94	71	46	32			33	25	10	SM									

VEERBERG PTS (b)		USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	COR
			DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)							
			(pcf)	(kg/m ³)				(pcf)	(kg·m ³)								
	NP	GM															
26	24	CH						110.0	1762	19.0							*
	NP	SM															
32	35	SC						104.7	1677	20.7							*
19	8	CL															
		SM															
	NP	SM															
		SM															
		SM															
	NP	ML															
	NP	SM															
		SM															
	NP	SM															
		CH														*	
21	2	ML															
		SM														*	
		SM															
		CH														*	
		SM															
2	13	CL									2.61						
		SM															
3	10	SM															

SUMMARY OF LABORATORY TEST RESULTS
VERIFICATION SITE, WHITE RIVER COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE SANSO

TABLE
9-1
4 OF 5

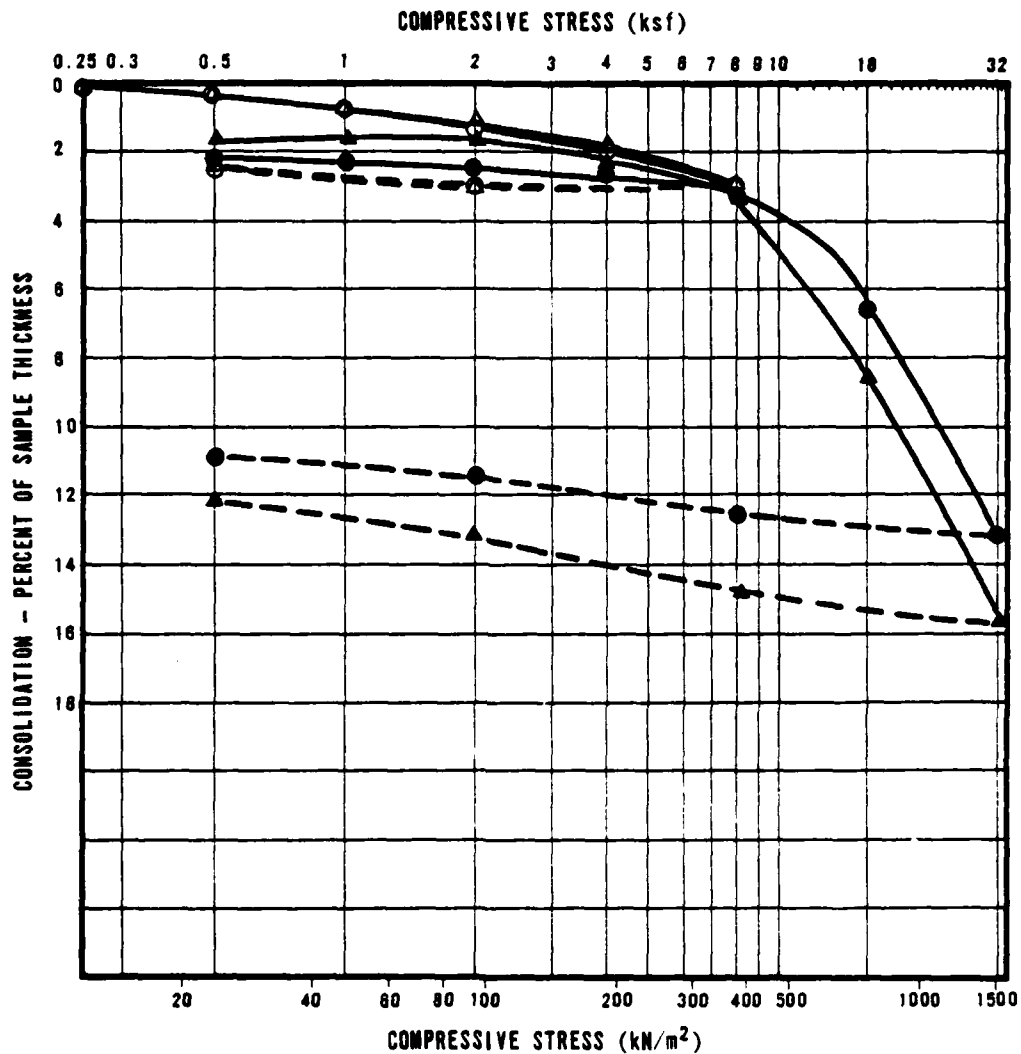
FUGRO NATIONAL INC.

[illegible]

NOTES:

- (a) Sample types
SS - Standard split spoon
P - Pitcher
D - Fugro Drive
B.b - Bulk
(b) NP - Not Plastic
- (c) USCS - Unified Soil Classification System
(d) * Indicates that test has been performed and results are included in this report

3



SYMBOL	BORING NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	INITIAL DRY DENSITY		INITIAL MOISTURE CONTENT (%)	INITIAL VOID RATIO	INITIAL DEGREE OF SATURATION (%)
			FEET	METERS		pcf	kN/m ³			
○	WR-B-1	P-6	20.0-20.8	6.10-6.34	MH	77.4	1240	33.6	1.18	77.2
△	WR-B-3	P-7	25.4-26.2	7.74-7.99	CH	88.2	1093	45.1	1.47	82.8

- AT FIELD MOISTURE
● AFTER ADDITION OF WATER

— COMPRESSION
- - - REBOUND

CONSOLIDATION TEST RESULTS
VERIFICATION SITE, WHITE RIVER COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SANSO

FIGURE
9-1

FUGRO NATIONAL, INC.

SUMMARY OF TRIAXIAL COMPRESSION TEST RESULTS

VERIFICATION SITE, WHITE RIVER CDP, NEVADA

**TABLE
9-2**

AFV-10

[illegible]

**SUMMARY OF UNCONFINED COMPRESSION
TEST RESULTS
VERIFICATION SITE, WHITE RIVER CDP, NEVADA**

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSQ

TABLE
9-3

TIERO NATIONAL, INC.

SUMMARY OF DIRECT SHEAR TEST RESULTS
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

**TABLE
9-4**

FUGRO NATIONAL, INC.

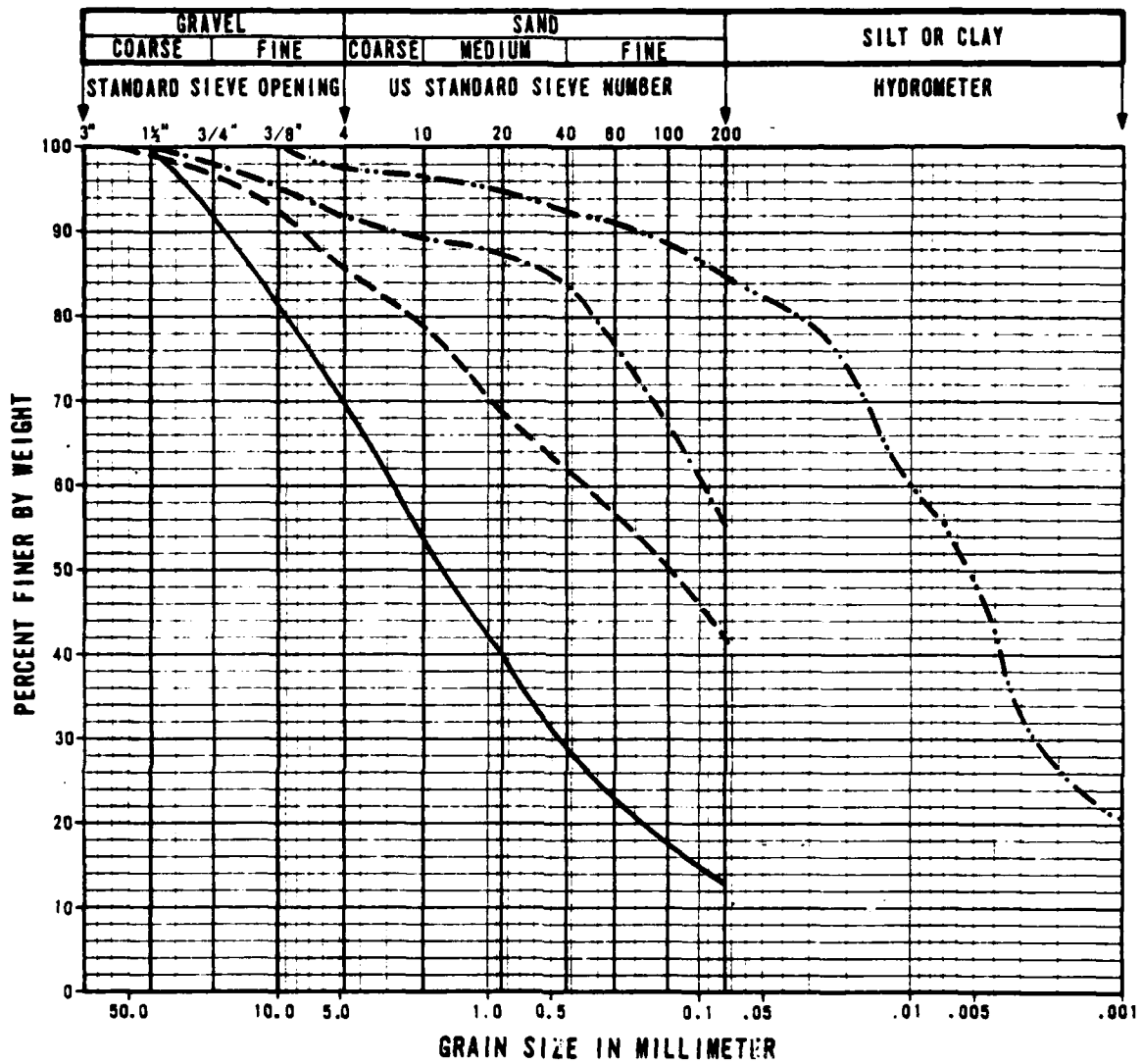
[illegible]

SUMMARY OF CHEMICAL TEST RESULTS
VERIFICATION SITE, WHITE RIVER COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

**TABLE
9-5**

FUGRO NATIONAL, INC.



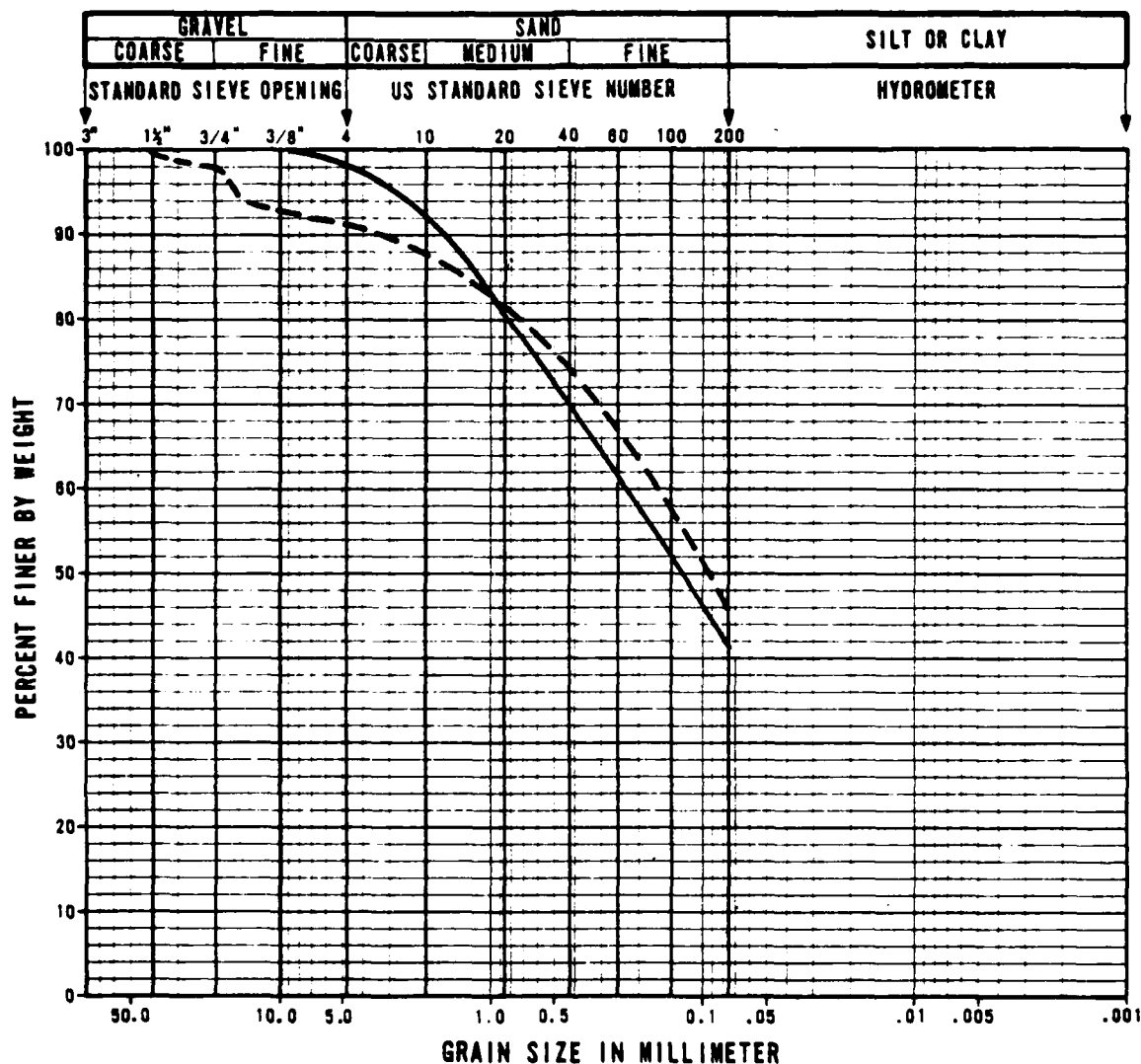
SYMBOL	COMPOSITE SAMPLE NUMBER	ACTIVITY NUMBER	SAMPLE INTERVAL		SOIL TYPE
			FEET	METERS	
—	A	WR-T-1	0.1-2.0	0.03-0.61	SM
- - -	B	WR-T-2	0.25-1.5	0.07-0.46	SM
- . -	C	WR-T-4	0.25-2.0	0.07-0.61	ML
- - -	D	WR-T-6	0.75-2.0	0.23-0.61	CH

GRAIN SIZE CURVES, CBR TESTS
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
9-2
1 OF 2

FUGRO NATIONAL INC.



SYMBOL	COMPOSITE SAMPLE NUMBER	ACTIVITY NUMBER	SAMPLE INTERVAL		SOIL TYPE
			FEET	METERS	
—	E	WR-T-8	0.5-2.0	0.15-0.61	SC
---	F	WR-CS-36	0.25-1.50	0.08-0.46	SM
		WR-CS-44	0.25-1.50	0.08-0.46	

GRAIN SIZE CURVES, CBR TESTS
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
9-2
2 OF 2

TUBRO NATIONAL INC.

CHECKED BY _____ APPROVED BY _____

COMPOSITE SAMPLE NUMBER	SOIL TYPE	PERCENT PASSING #200	ATTERBERG LIMITS		SPECIFIC GRAVITY	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	COMPACTED DRY DENSITY		COMPACTED MOISTURE (%)	PERCENT OF MAXIMUM DRY DENSITY	CBR (%)
			LL	PI		pcf	kg/m ³		pcf	kg/m ³			
A	SW	13				126.0	2019	9.0	115.8	1855	10.5	91.9	76
									113.8	1823	10.4	90.3	28
B	SW	42				114.5	1834	14.0	107.8	1727	14.7	94.1	49
									101.5	1626	14.3	88.6	13
									84.4	1512	13.9	82.4	2
C	ML	55	24	1	2.62	122.8	1967	11.3	113.5	1818	10.7	92.4	20
									104.1	1668	11.1	84.8	4
									93.6	1498	11.2	76.2	1
D	CH	85	50	24		110.0	1762	19.0	107.0	1714	19.0	97.3	5
									99.0	1586	19.3	90.0	3
									80.2	1445	19.5	82.0	2

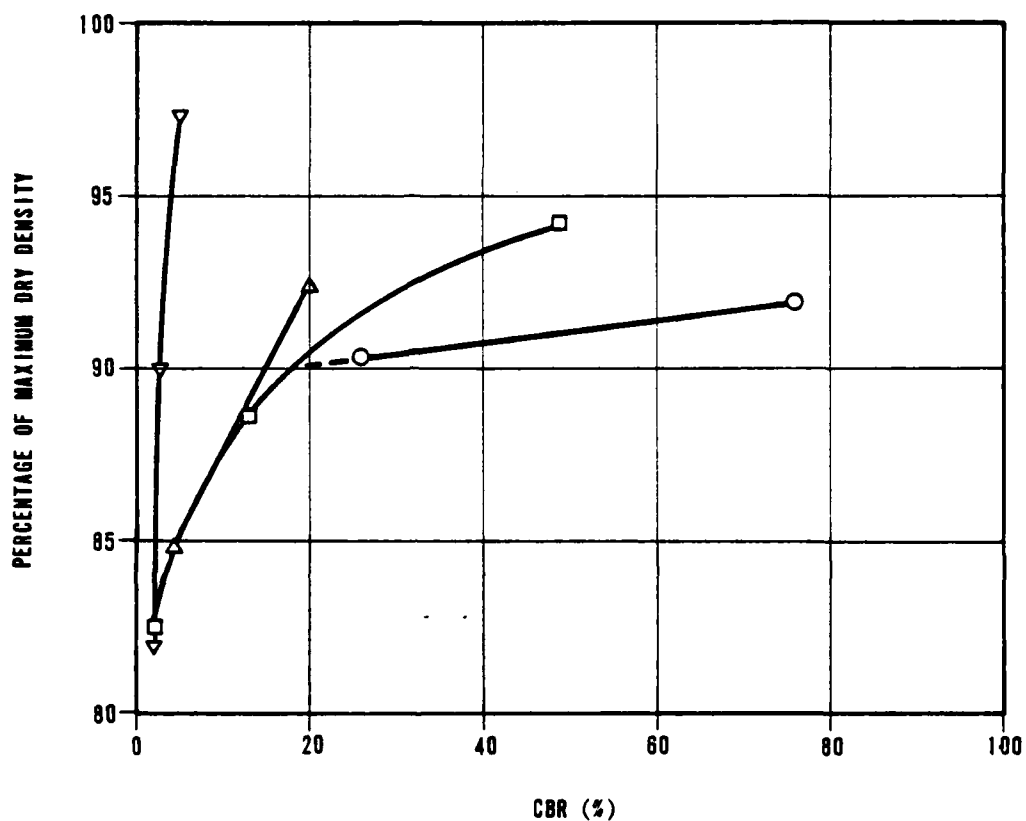
CALIFORNIA BEARING RATIO (CBR) TEST RESULTS
VERIFICATION SITE, WHITE RIVER CDP, NEVADAMX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSOTABLE
9-6
1 OF 2

FUERO NATIONAL, INC.

CALIFORNIA BEARING RATIO (CBR) TEST RESULTS
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

TABLE
9-6
2 OF 2

AFV-13



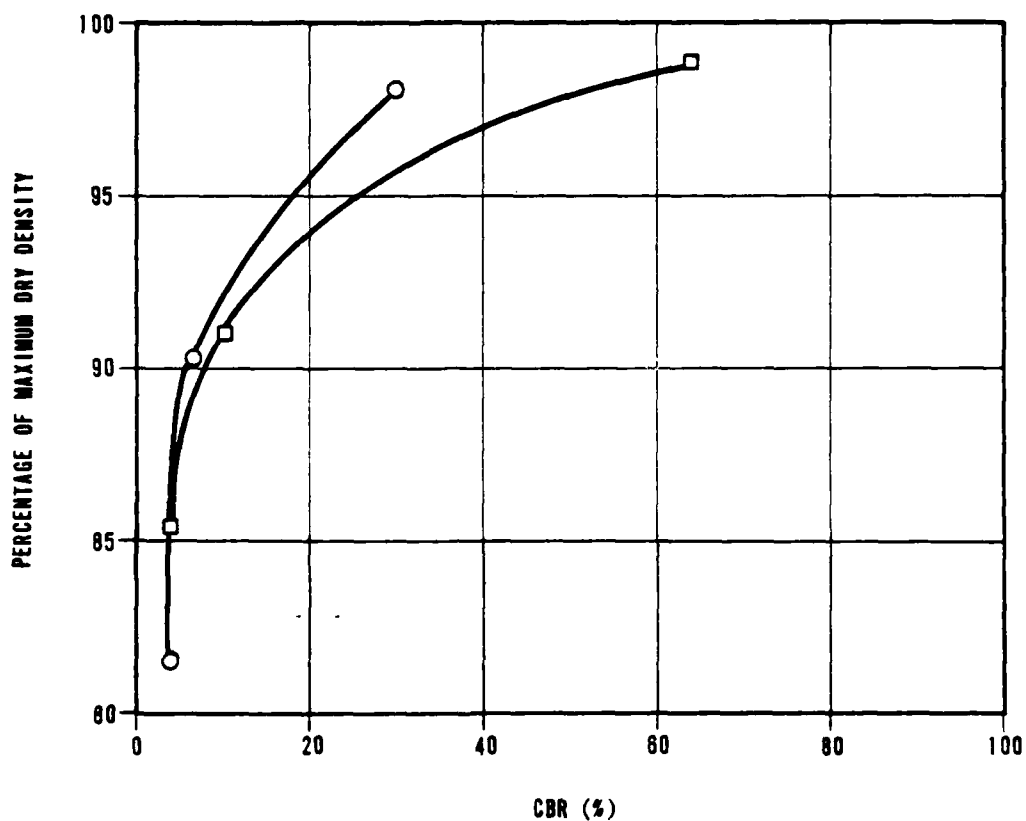
SYMBOL	COMPOSITE SAMPLE NUMBER	SOIL TYPE
○	A	SM
□	B	SM
△	C	ML
▽	D	CH

CALIFORNIA BEARING RATIO (CBR) CURVES
VERIFICATION SITE, WHITE RIVER COP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
9-3
1 OF 2

FUGRO NATIONAL, INC.



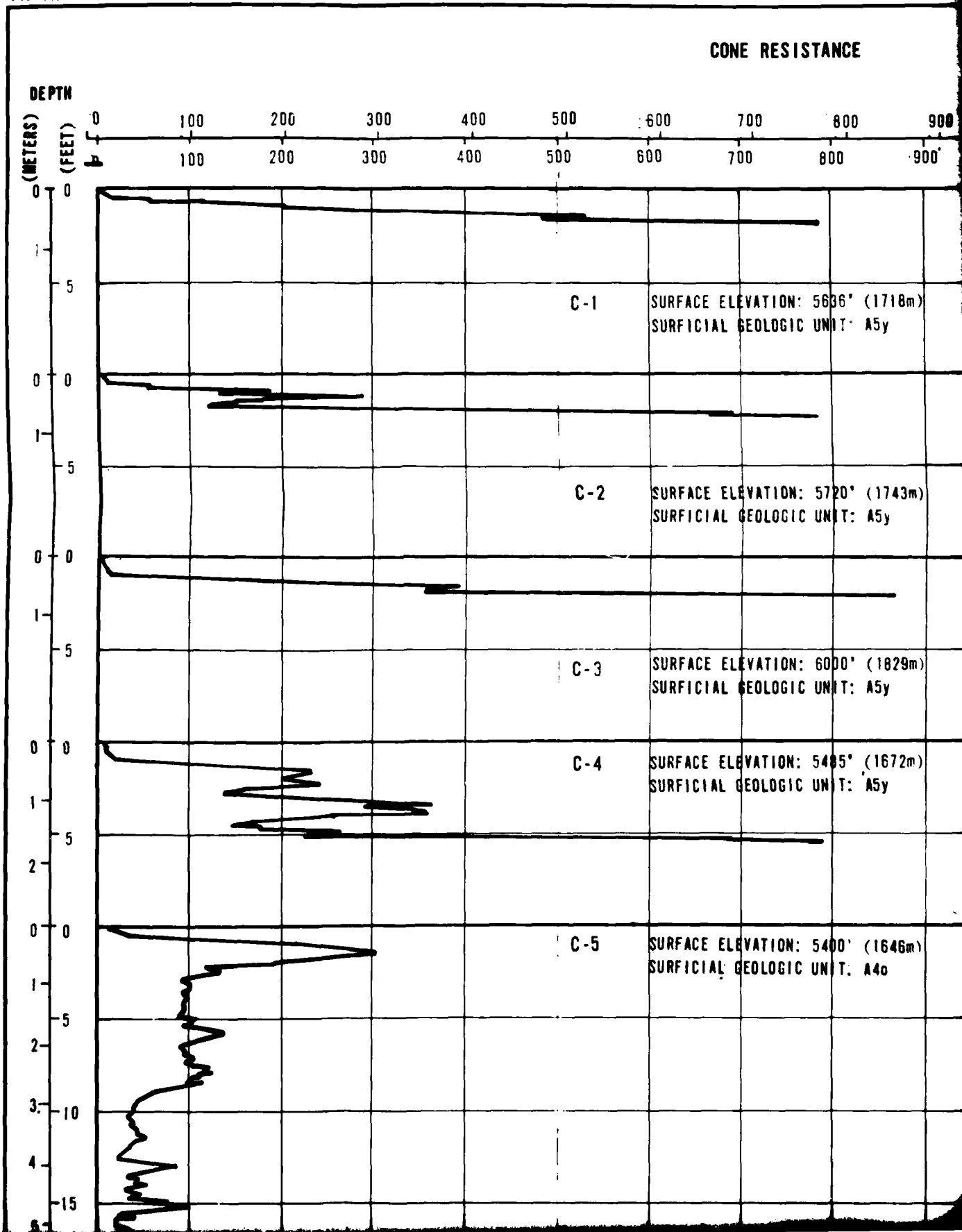
SYMBOL	COMPOSITE SAMPLE NUMBER	SOIL TYPE
○	E	SC
□	F	SN

CALIFORNIA BEARING RATIO (CBR) CURVES
VERIFICATION SITE, WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
9-3
2 OF 2

FUGRO NATIONAL, INC.



2

CONE RES

900 (kg/cm²)
900 (tsf)

SOIL
COLUMN

CL

CS-1

SM

P-18

SM

CS-3

ML

GP

P-17

CL

CS-5

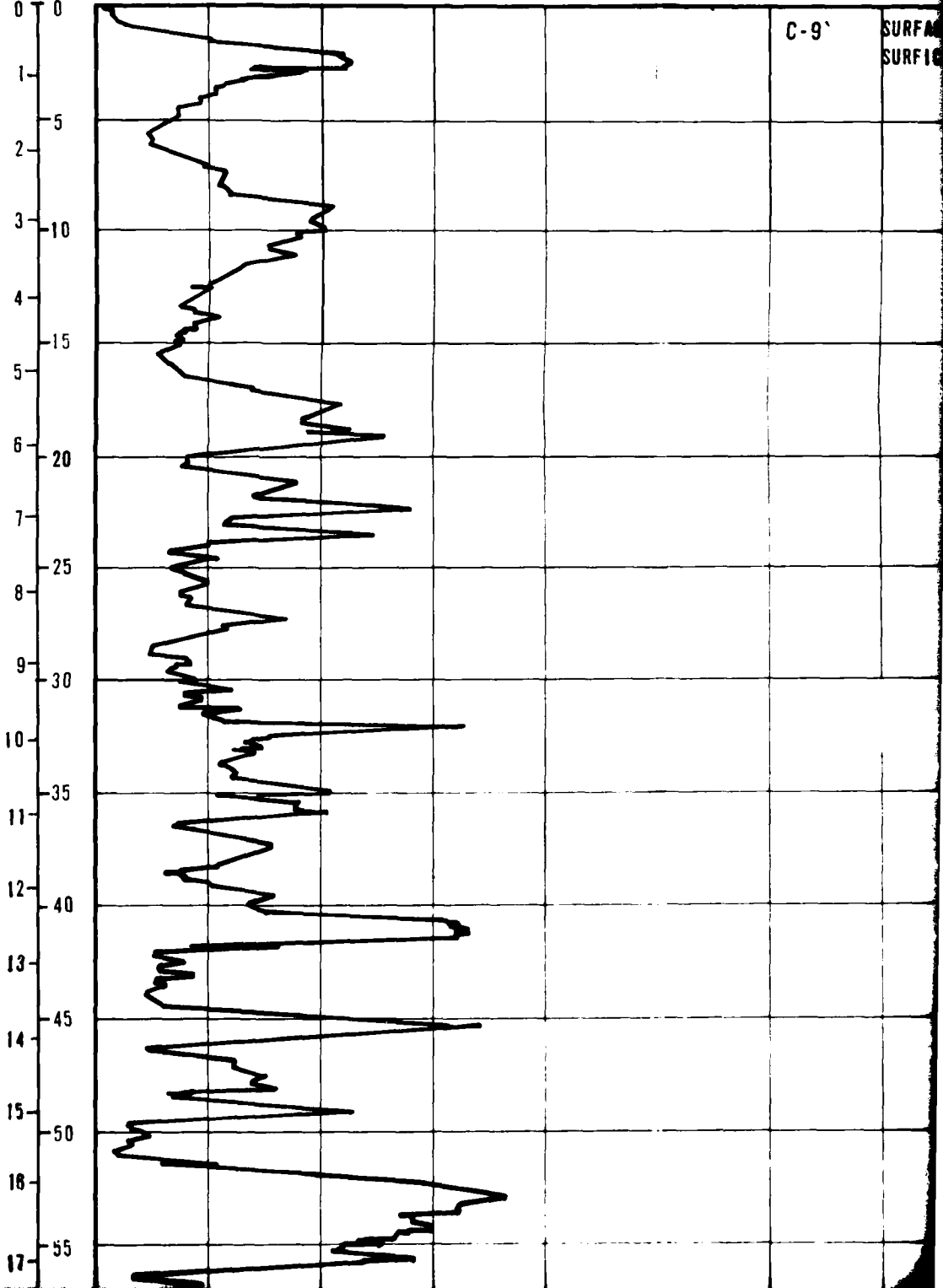
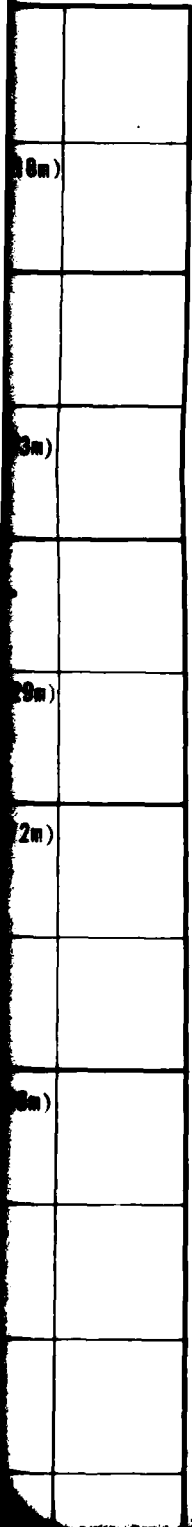
DEPTH

(METERS)
(FEET)

0 100 200 300 400 500 600 700
0 100 200 300 400 500 600 700

C-9'

SURFACE
SURFACE



SURFACE ELEVATION:	5374' (1638m)
SURFICIAL GEOLOGIC UNIT:	A5y A4d

SOIL COLUMN

SM

CH

CL

CH

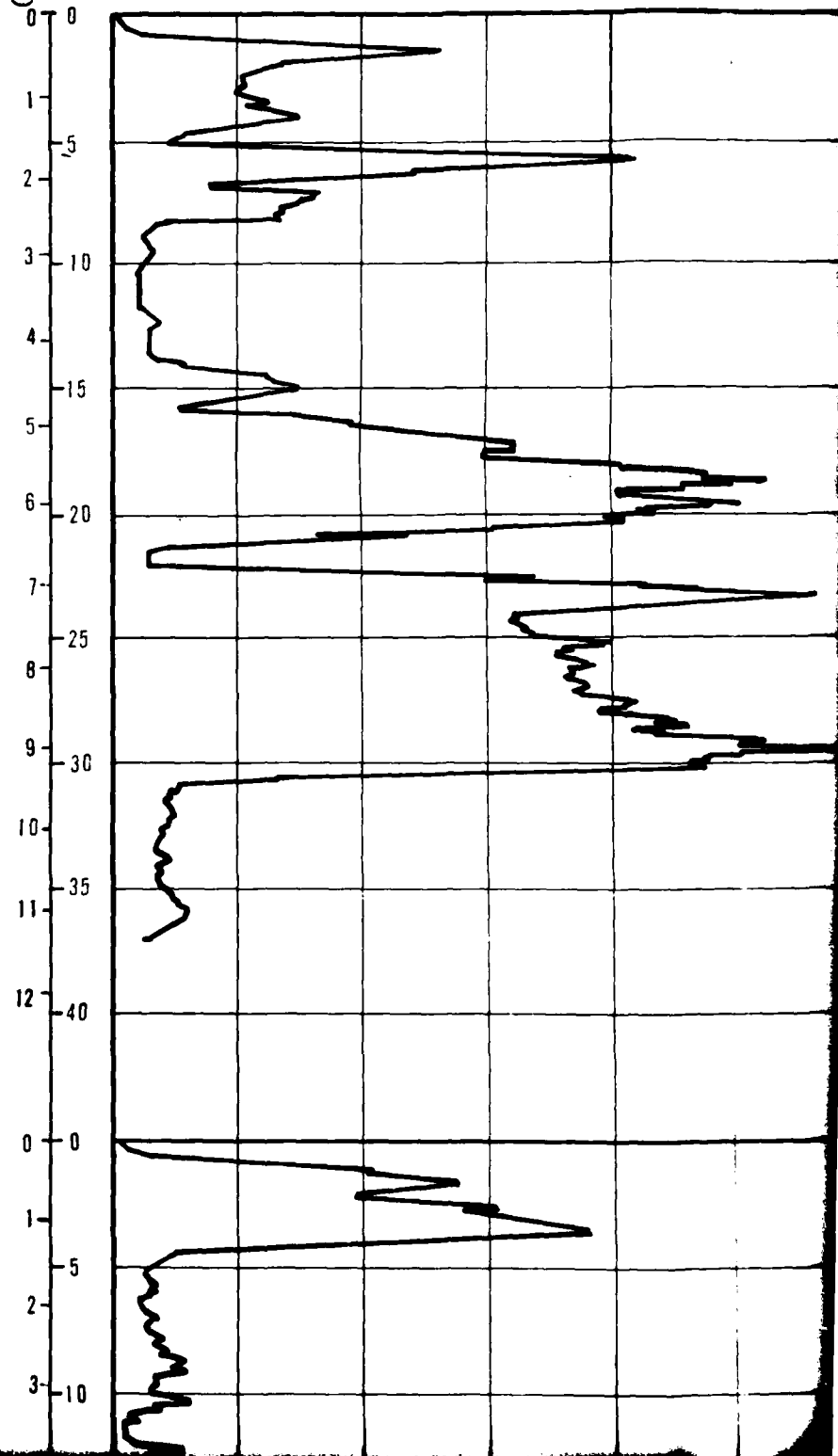
CL

SM

CL

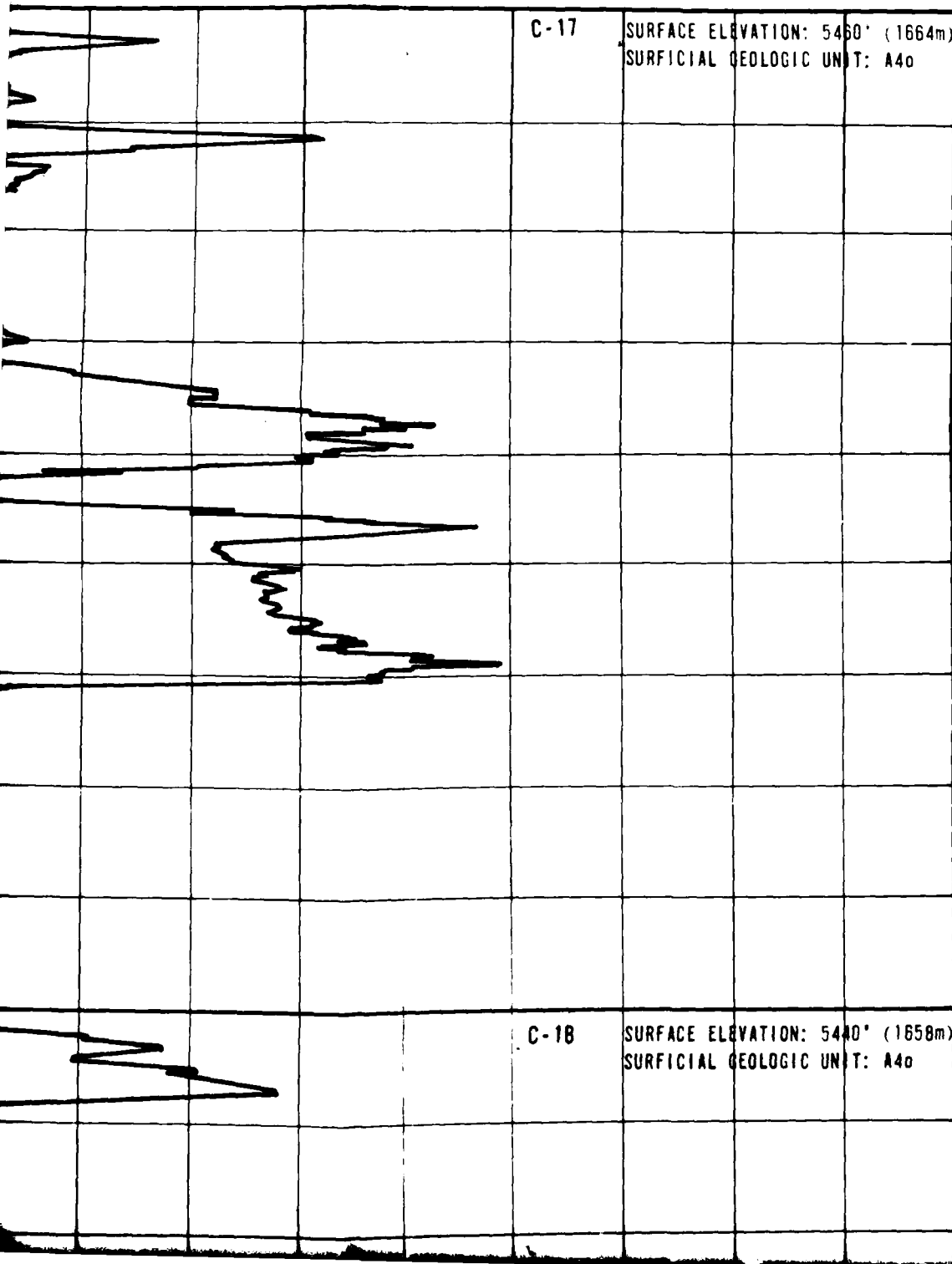
SM

DEPTH

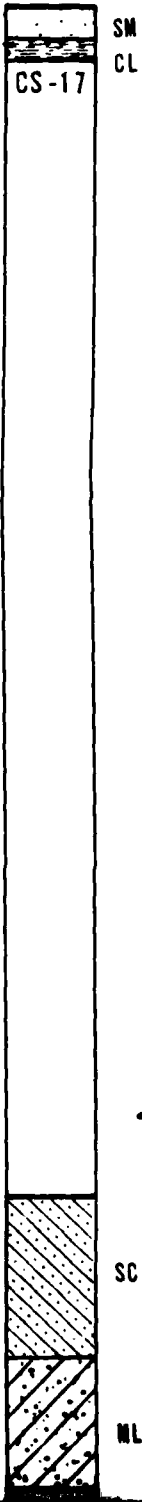


CONE RESISTANCE

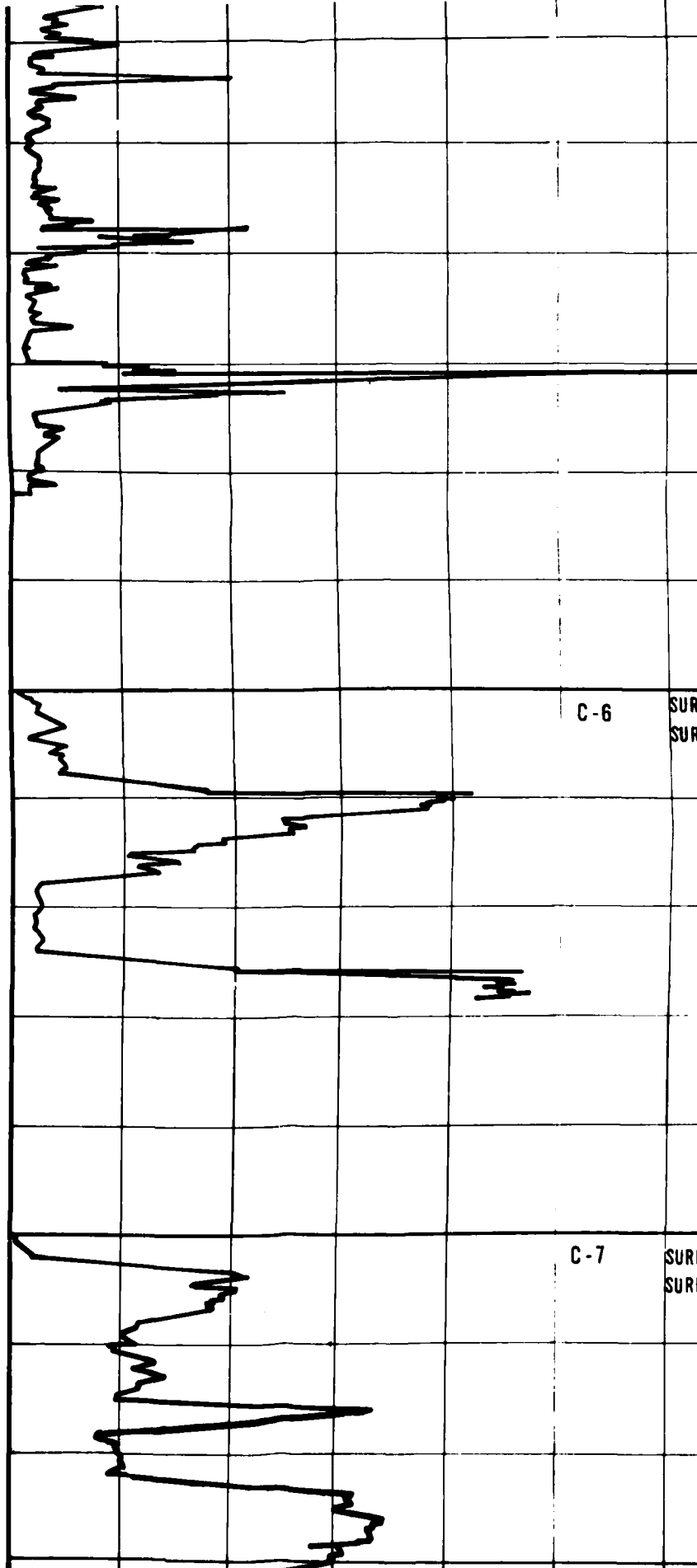
200 300 400 500 600 700 800 900 (kg/cm²)
 200 300 400 500 600 700 800 900 (tsf)



SOIL COLUMN



5
+
15
20
25
30
35
40
0
5
10
15
20
0
5
10
15



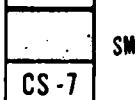
C-6

SURFACE ELEVATION: 5360' (1634m)
SURFICIAL GEOLOGIC UNIT: A1

C-7

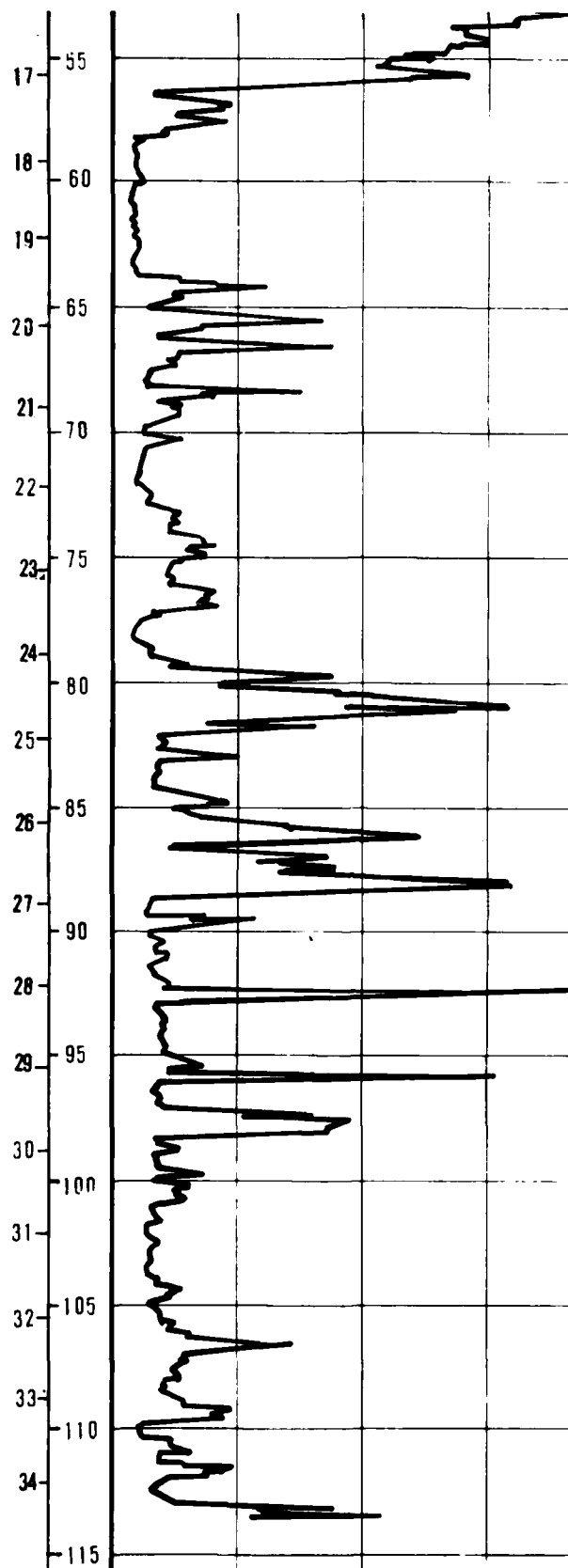
SURFACE ELEVATION: 5360' (1634m)
SURFICIAL GEOLOGIC UNIT: A4a

SURFICIAL GEOLOGIC UNIT: A4b



CH

SM



No Data Available-Equipment Malfunction

C-10

SURFACE E
SURFICIAL

6.11

7

CL

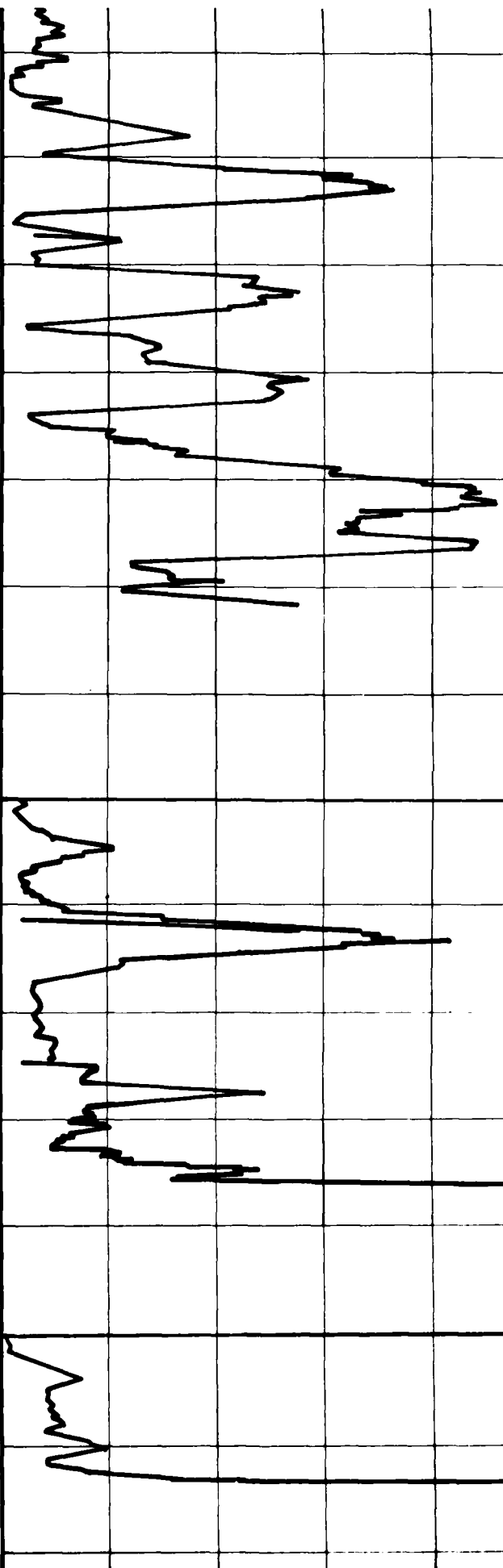
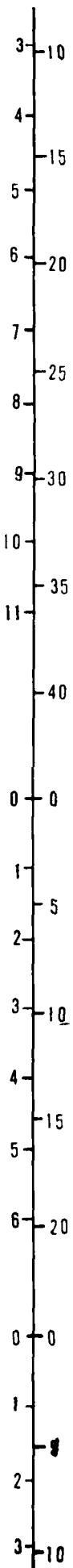
SC

CL

B-3

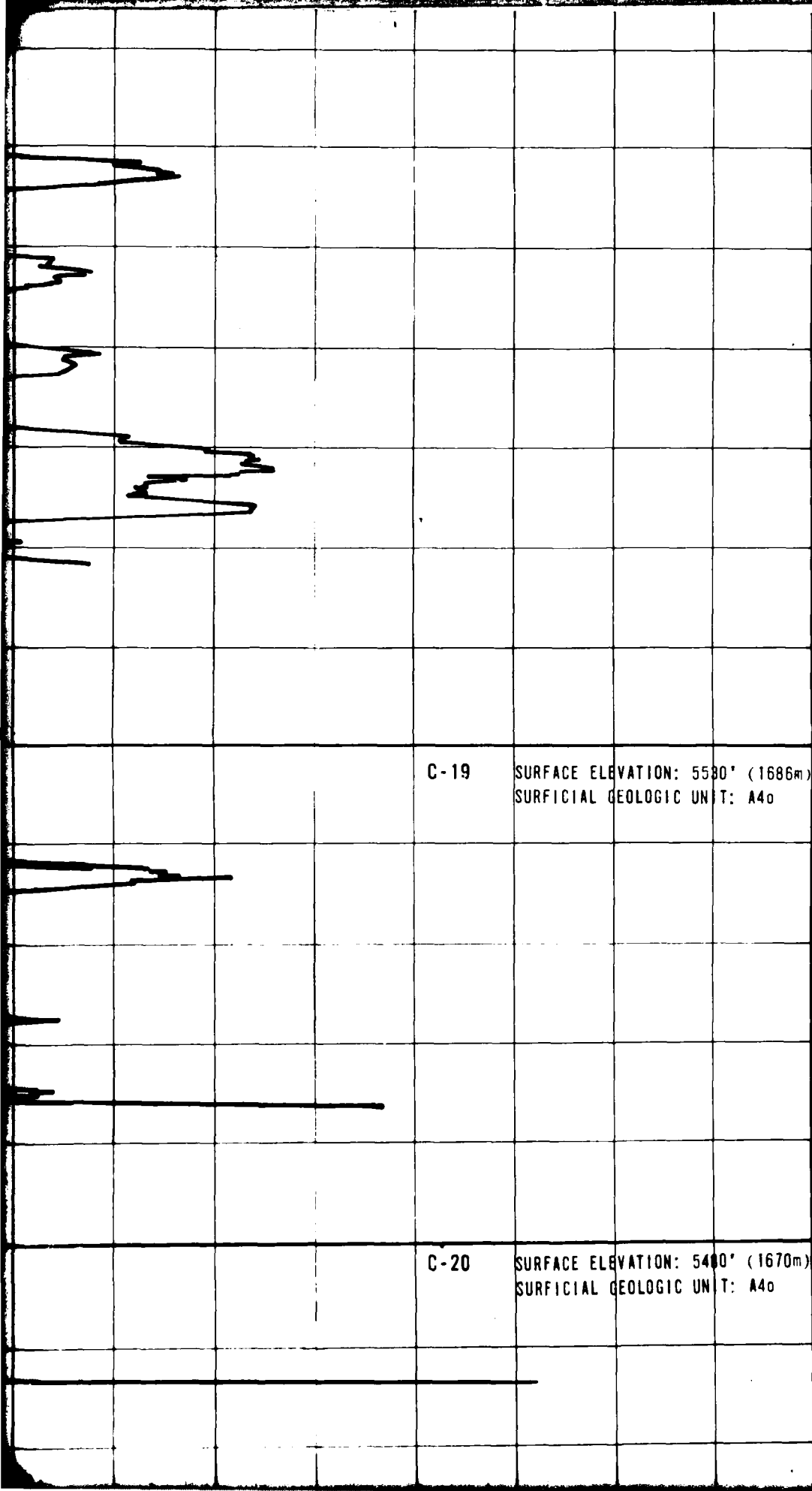
ML
SM

P-15



SURFACE ELEVATION: 5470' (1667m)
SURFICIAL GEOLOGIC UNIT: A5y

8



SURFACE ELEVATION: 5580' (1686m)
SURFICIAL GEOLOGIC UNIT: A4o

SURFACE ELEVATION: 5400' (1670m)
SURFICIAL GEOLOGIC UNIT: A4o



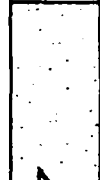
ML



SM



SP



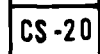
SM



B-4

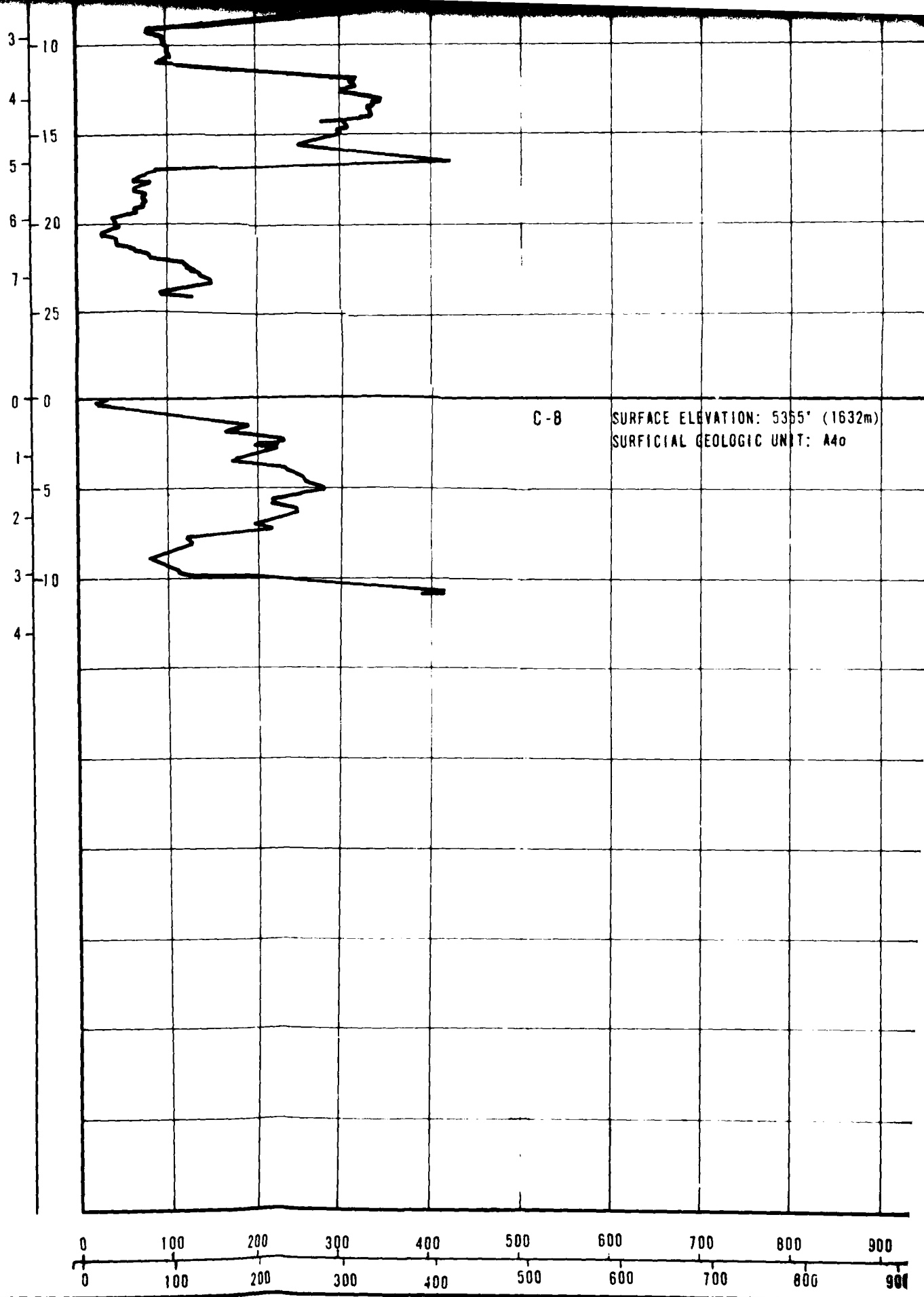


CL



CS-20

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2 JUL 79

CH
P-16

0 0
0 0
0 0
0 0
1 5
0 0
1 5
0 0
1 5
2 5
3 10
0 0
1 5
2 5
3 10
4

No Data Available - Equipment Malfunction

C-10

SURFACE
SURFICIAL

No Data Available - Equipment Malfunction

C-11

SURFACE
SURFICIAL

No Data Available - Equipment Malfunction

C-12

SURFACE
SURFICIAL

C-13

SURFACE
SURFICIAL

C-14

SURFACE
SURFICIAL

C-15

SURFACE
SURFICIAL

C-16

SURFACE
SURFICIAL

0 100 200 300 400 500 600 700
0 100 200 300 400 500 600 700

000 (tsf)
900 (kg/cm²)

FACE ELEVATION: 5470' (1667m)
 OFFICIAL GEOLOGIC UNIT: A5y

FACE ELEVATION: 5356' (1633m)
 OFFICIAL GEOLOGIC UNIT: A4o

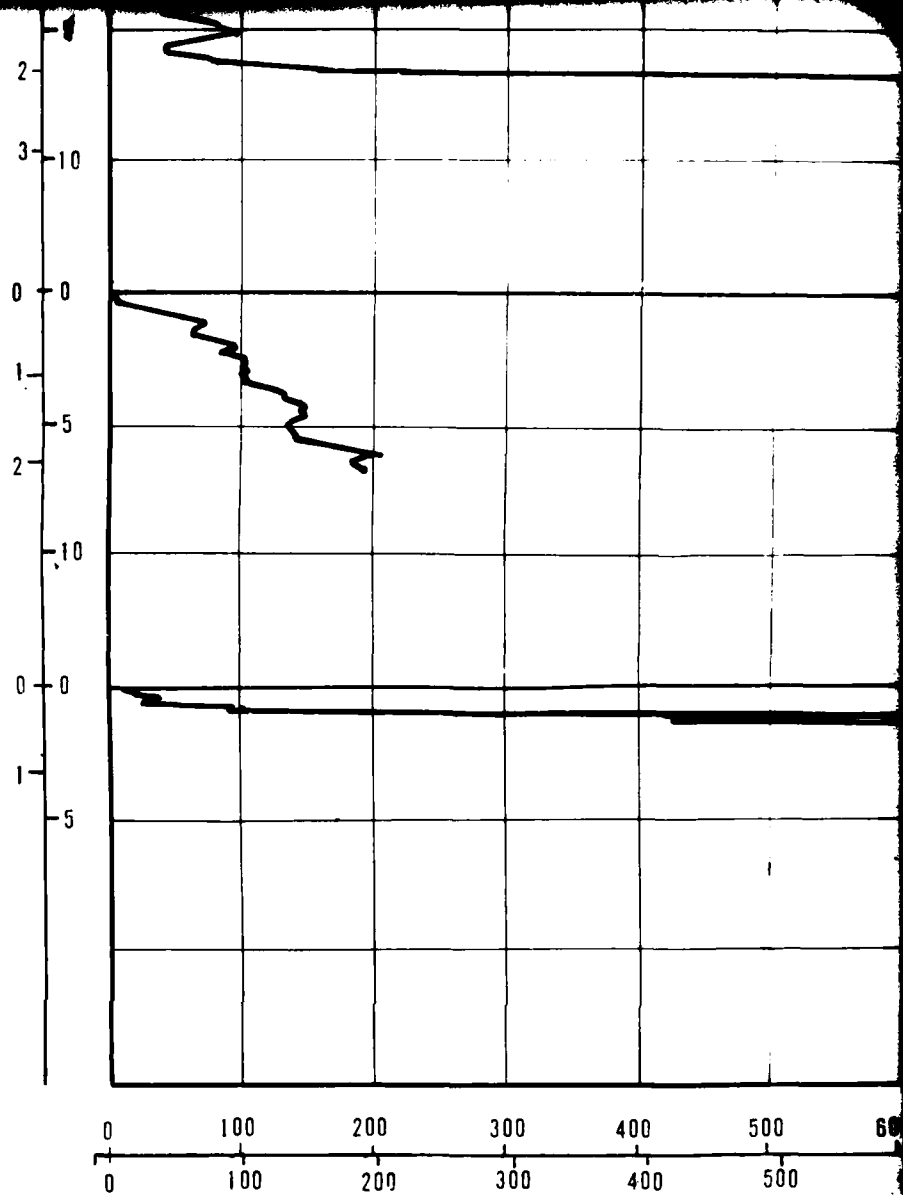
FACE ELEVATION: 5636' (1718m)
 OFFICIAL GEOLOGIC UNIT: A5y

FACE ELEVATION: 5500' (1676m)
 OFFICIAL GEOLOGIC UNIT: A5i

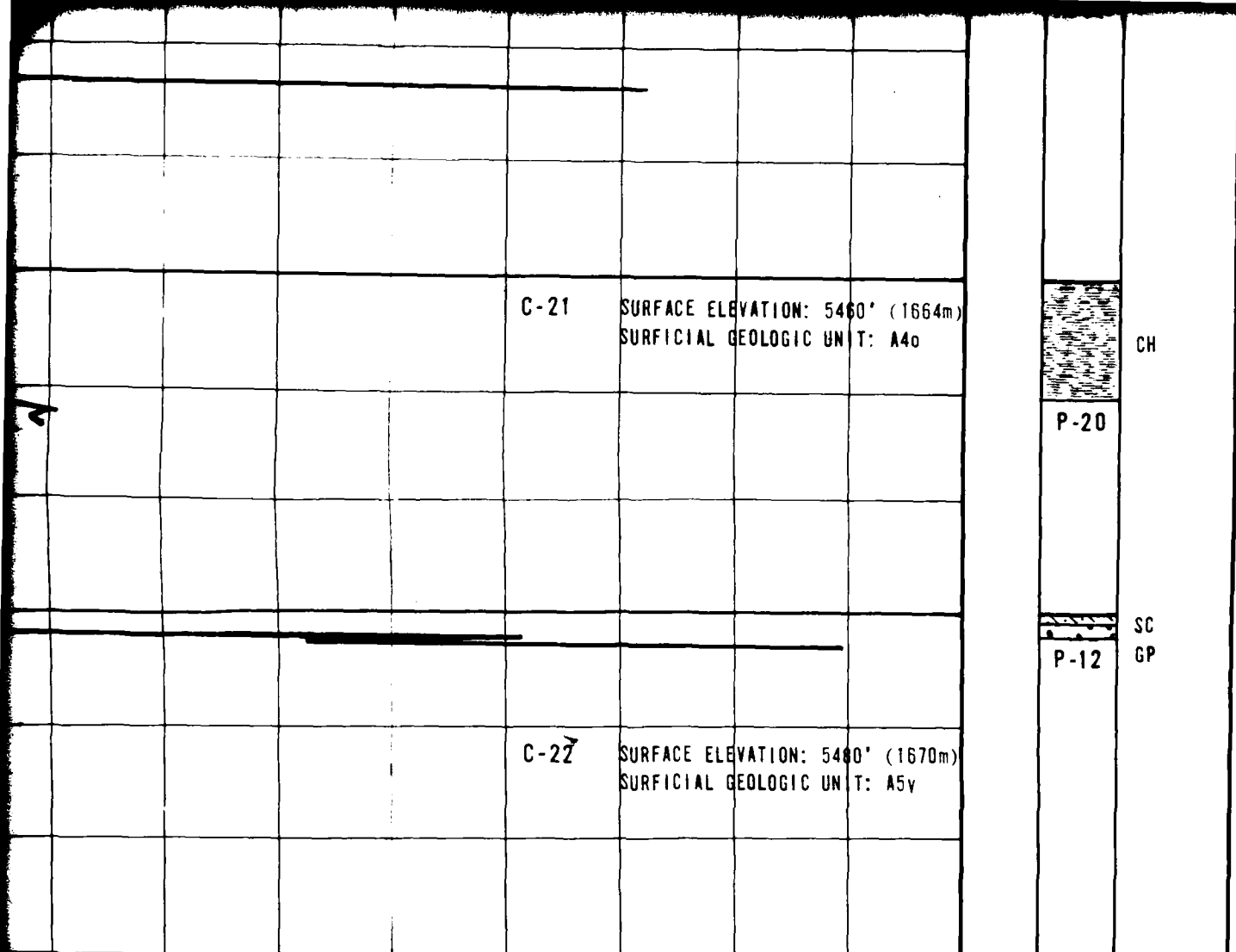
FACE ELEVATION: 5560' (1695m)
 OFFICIAL GEOLOGIC UNIT: A5i

FACE ELEVATION: 5472' (1668m)
 OFFICIAL GEOLOGIC UNIT: A1

FACE ELEVATION: 5470' (1667m)
 OFFICIAL GEOLOGIC UNIT: A4o



800 900 (tsf)
 800 900 (kg/cm²)



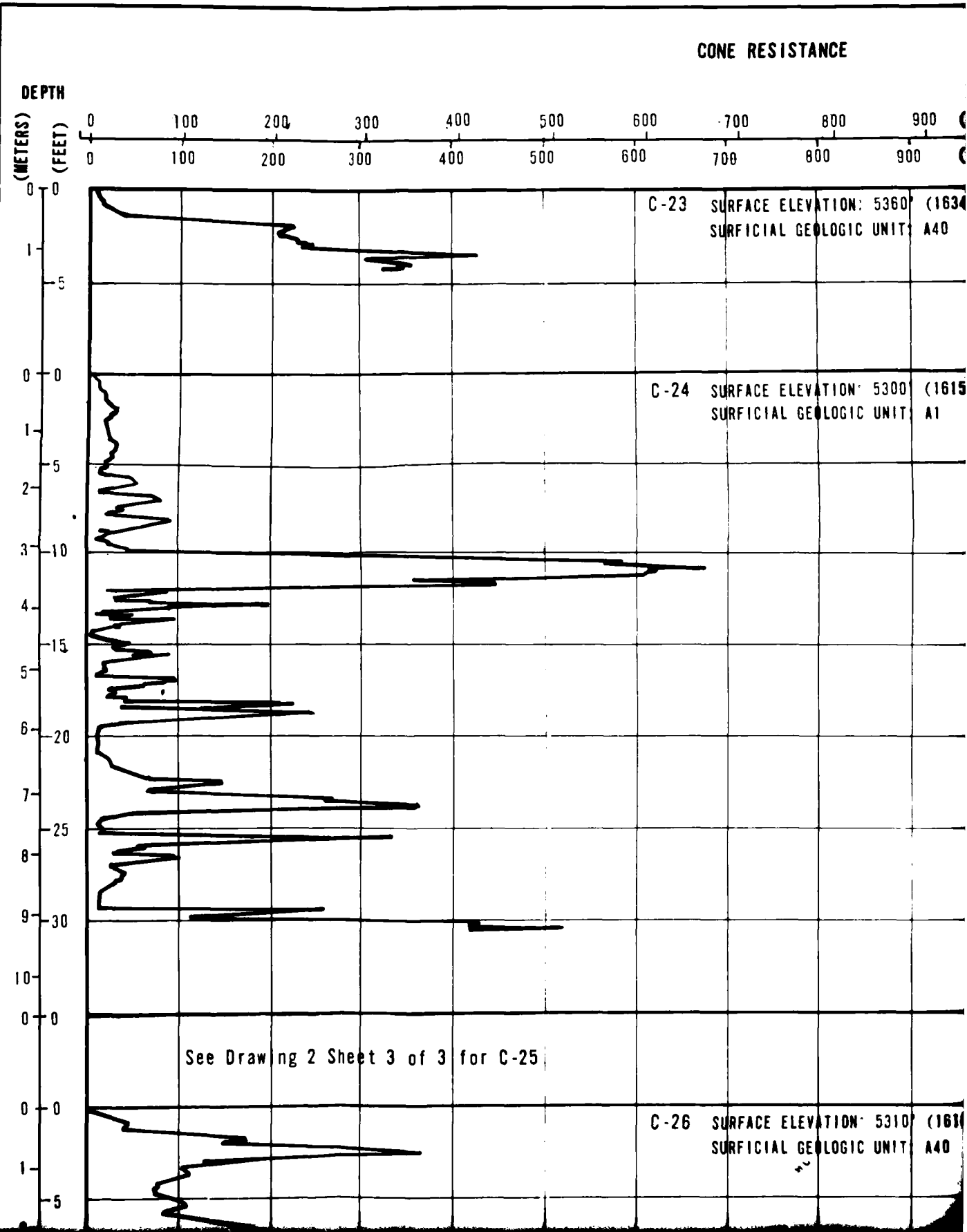
200 300 400 500 600 700 800 900 (tsf)
200 300 400 500 600 700 800 900 (kg/cm²)

CONE PENETROMETER TEST RESULTS
VERIFICATION SITE
WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

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2
1 OF 3

FUGRO NATIONAL, INC.



2

CONE RESISTANCE

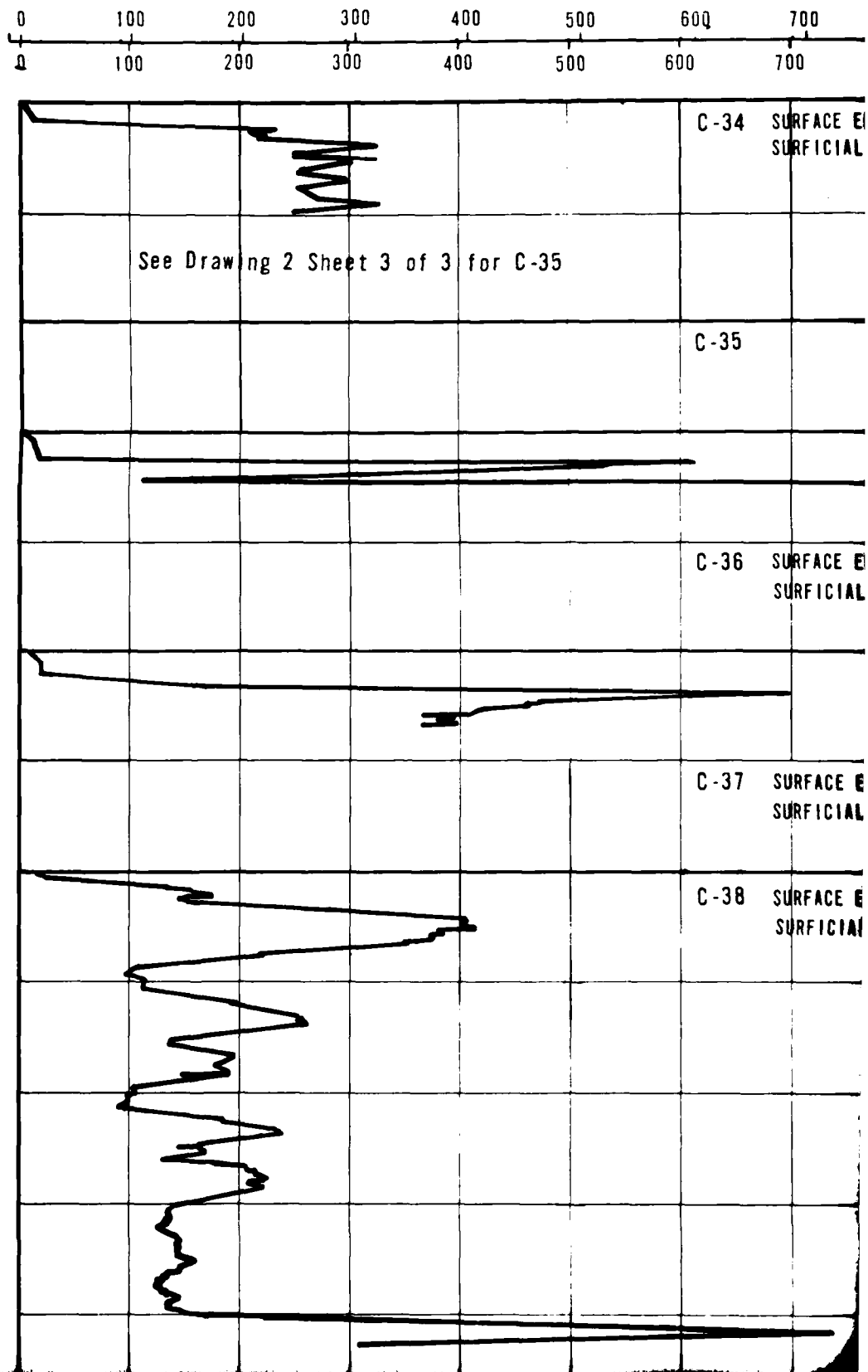
900 (kg/cm²)
800 (tsf)

SOIL COLUMN

10' (1634m)	SM
ST: A40	CS-23
10' (1615m)	CH
ST: A1	CS-24
10' (1618m)	CL
ST: A40	CS-26

DEPTH

(METERS) 0 1 2 3 4 5 6
(FEET) 0 100 200 300 400 500 600 700



RESISTANCE

800 900 (kg/cm²)
800 900 (tsf)

FACE ELEVATIONS: 5265' (1605m)
FICIAL GEOLOGIC UNIT: A40

FACE ELEVATIONS: 5210' (1588m)
FICIAL GEOLOGIC UNIT: A40

FACE ELEVATION: 5200' (1585m)
FICIAL GEOLOGIC UNIT: A40

FACE ELEVATION: 5240' (1597m)
FICIAL GEOLOGIC UNIT: A5y/A40

SOIL COLUMN

C-34 SM
SP-SM

CL
CS-36

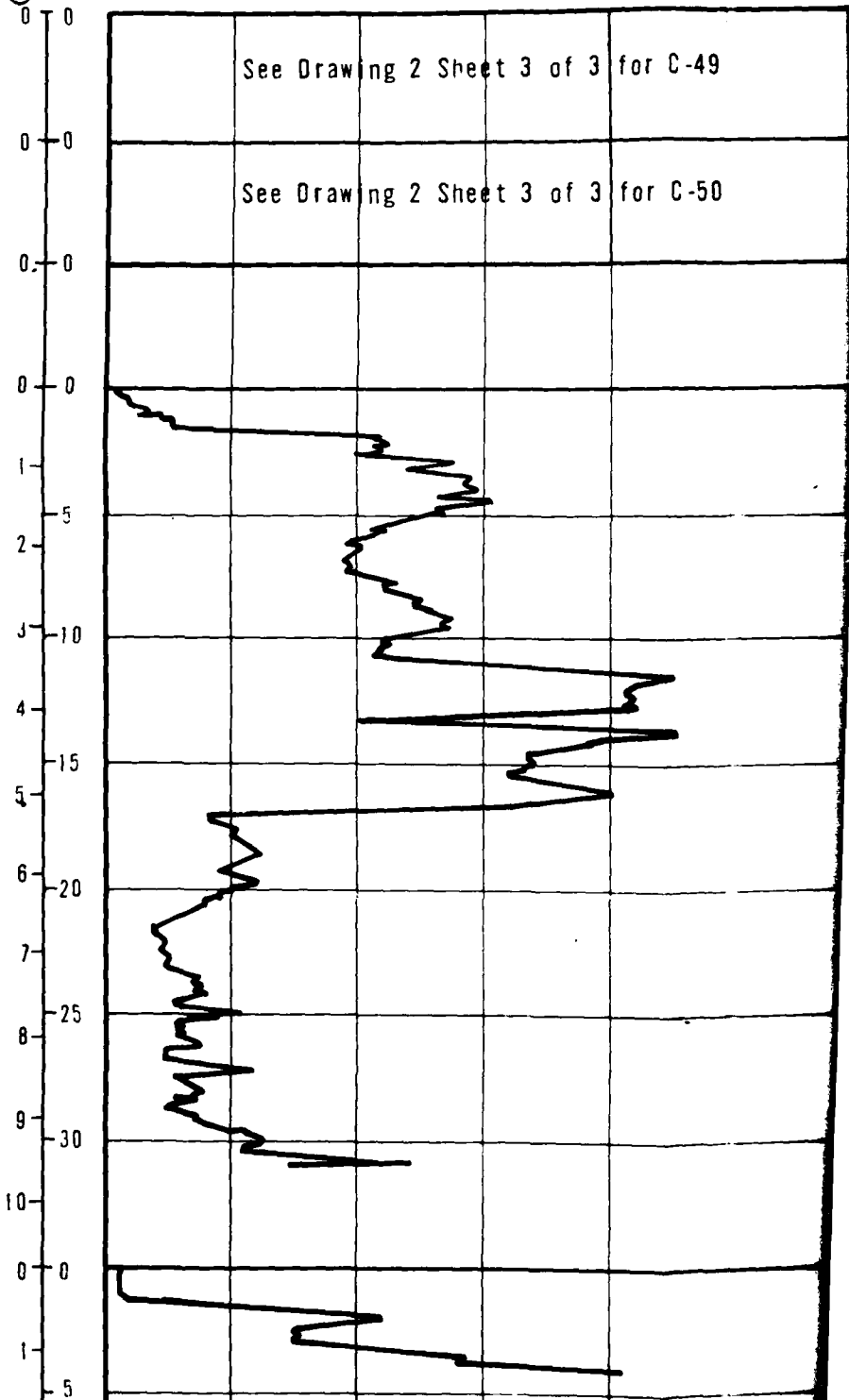
SM
CS-37

SM
SP
ML

T-1

DEPTH

(METERS) (FEET)
0 100 200 300 400 500 600



CONE RESISTANCE

200 300 400 500 600 700 800 900 (kg/cm²)
 200 300 400 500 600 700 800 900 (tsf)

SOIL
COLUMN

rawing 2 Sheet 3 of 3 for C-49

C-48

rawing 2 Sheet 3 of 3 for C-50

C-49

C-50

C-51

SURFACE ELEVATION: 5280' (1594m)
 SURFICIAL GEOLOGIC UNIT: A4o

CS-51

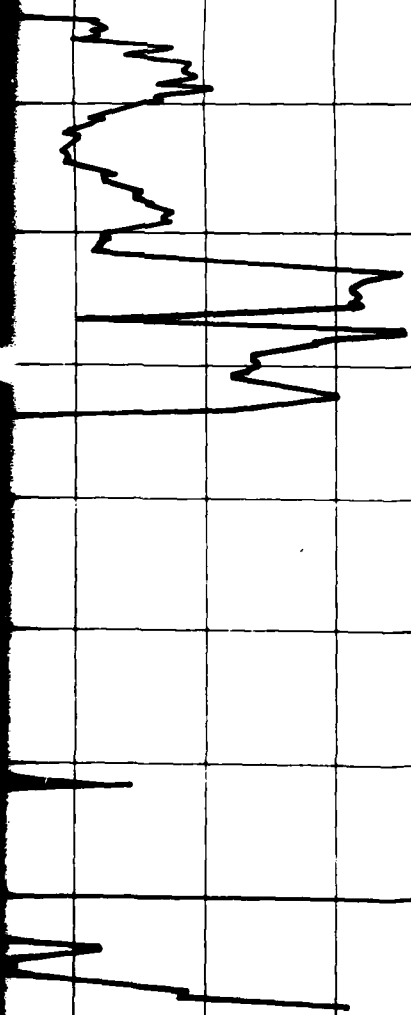
CL

C-52

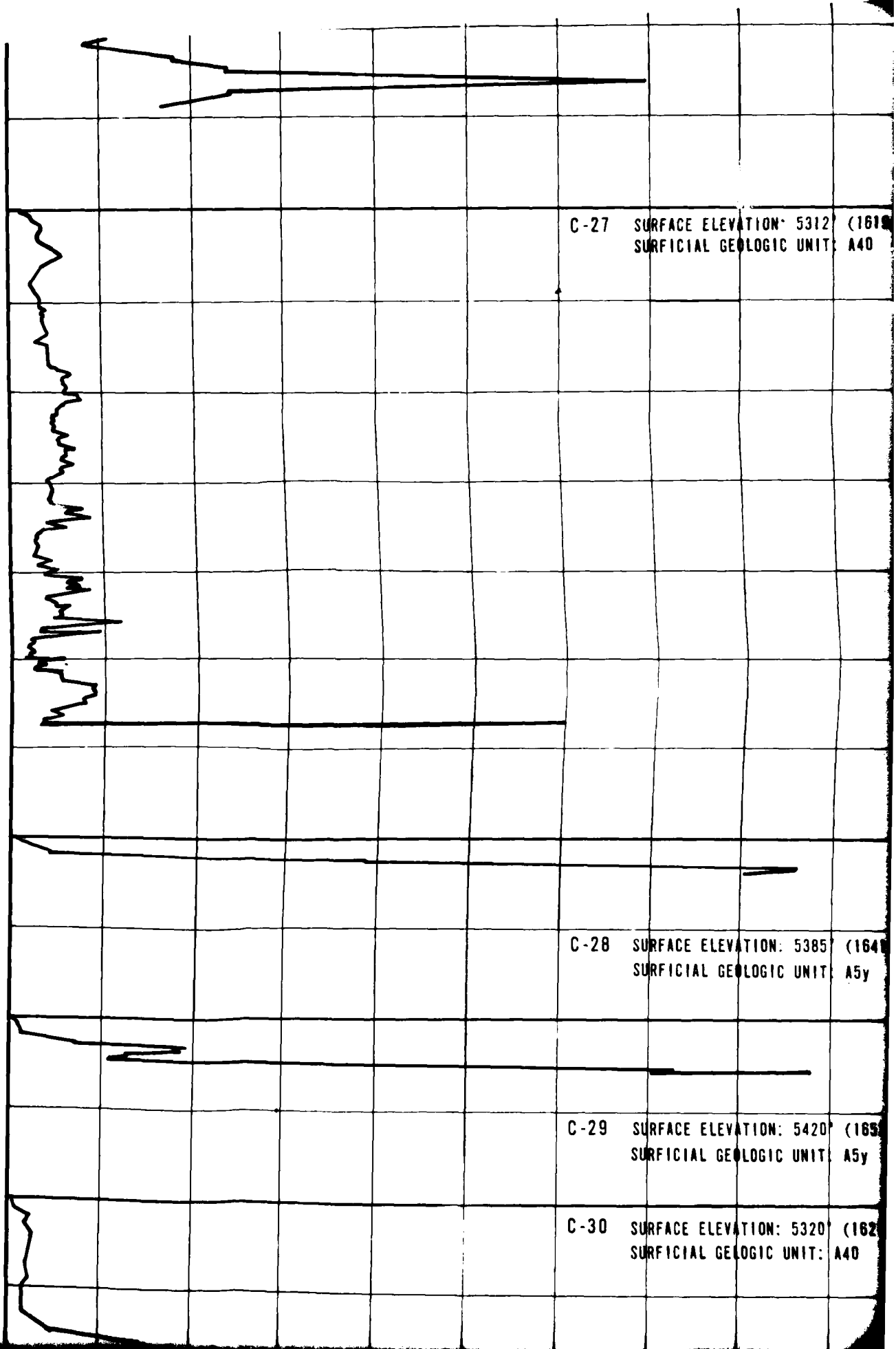
SURFACE ELEVATION: 5245' (1599m)
 SURFICIAL GEOLOGIC UNIT: A4o

SM

B-1



A vertical scale with tick marks and labels on both sides. The left side is labeled 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, 1, 0, 1, 0, 1, 2. The right side is labeled 0, 5, 10, 15, 20, 25, 30, 5, 0, 5, 0, 5. The scale is marked from 0 to 10 on both sides, with intermediate marks at 5 and 10.



SURFICIAL GEOLOGIC UNIT: A40

SM

B-1

C-30 SURFACE ELEVATION: 5320' (1627)
SURFICIAL GEOLOGIC UNIT: A40

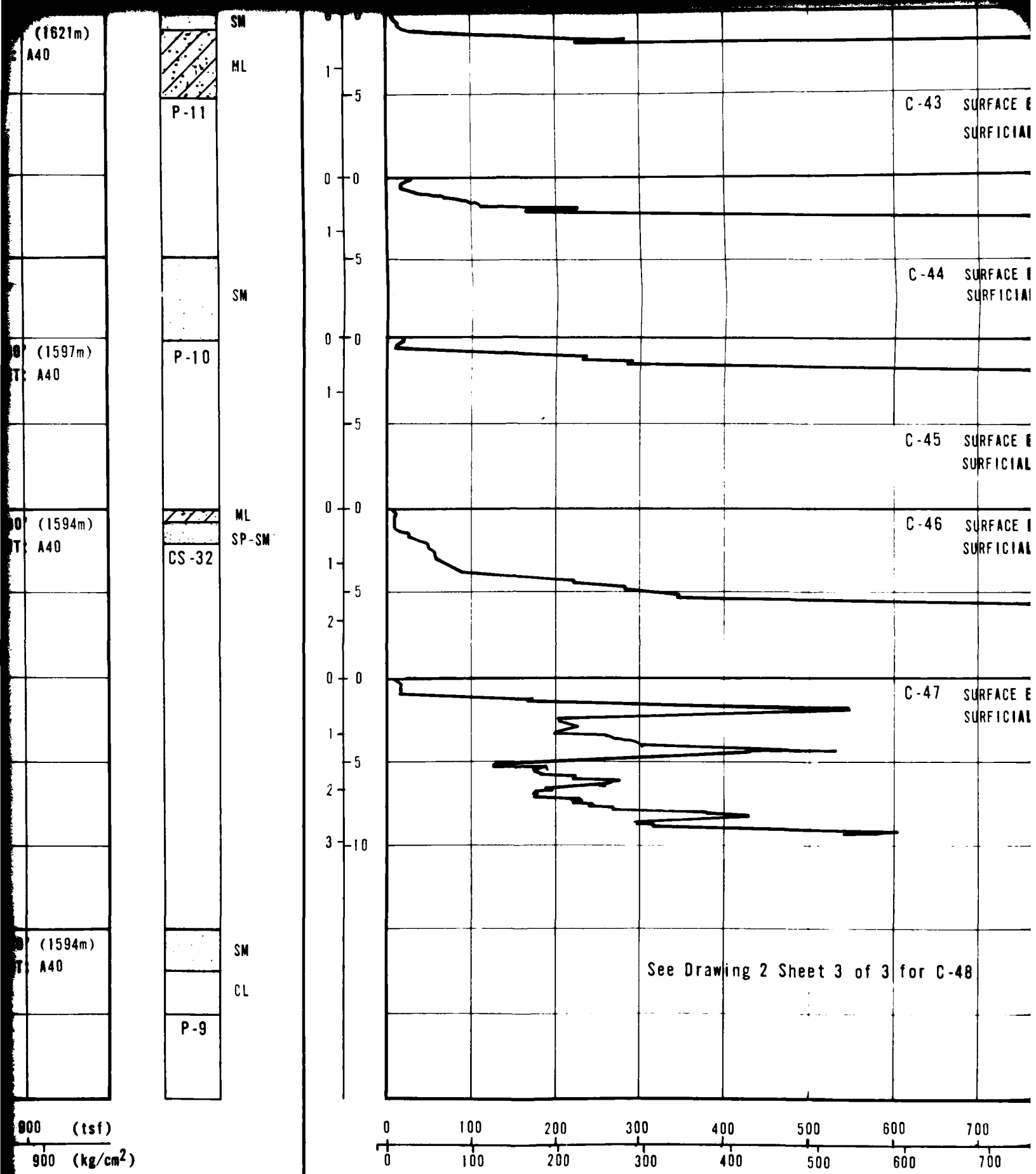
C-31 SURFACE ELEVATION: 5240' (1597)
SURFICIAL GEOLOGIC UNIT: A40

C-32 SURFACE ELEVATION: 5230' (1594)
SURFICIAL GEOLOGIC UNIT: A40

C-33 SURFACE ELEVATION: 5230' (1594)
SURFICIAL GEOLOGIC UNIT: A40

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ELEVATION: 5485' (1672m)		
AL GEOLOGIC UNIT: A5y		
ELEVATION 5560' (1695m)		
AL GEOLOGIC UNIT: A5i		
E ELEVATION: 5640' (1719m)		
AL GEOLOGIC UNIT: A5i		
E ELEVATION: 5430' (1655m)		
AL GEOLOGIC ELEVATION: A5y		
E ELEVATION: 5540' (1689m)		
AL GEOLOGIC UNIT: A5i		

P-2
CS-44
P-3
P-5
CS-47

CL

GP

CL

CS-44

CL

GP

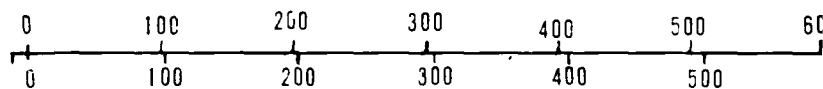
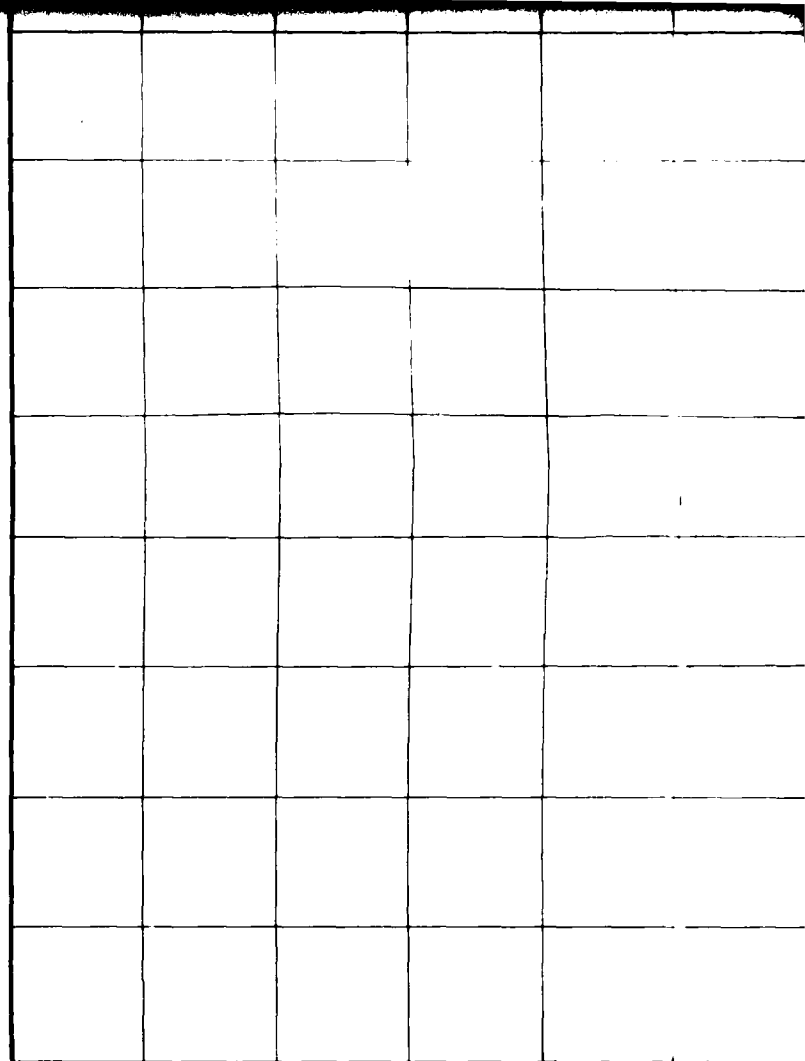
P-3

SM

CL

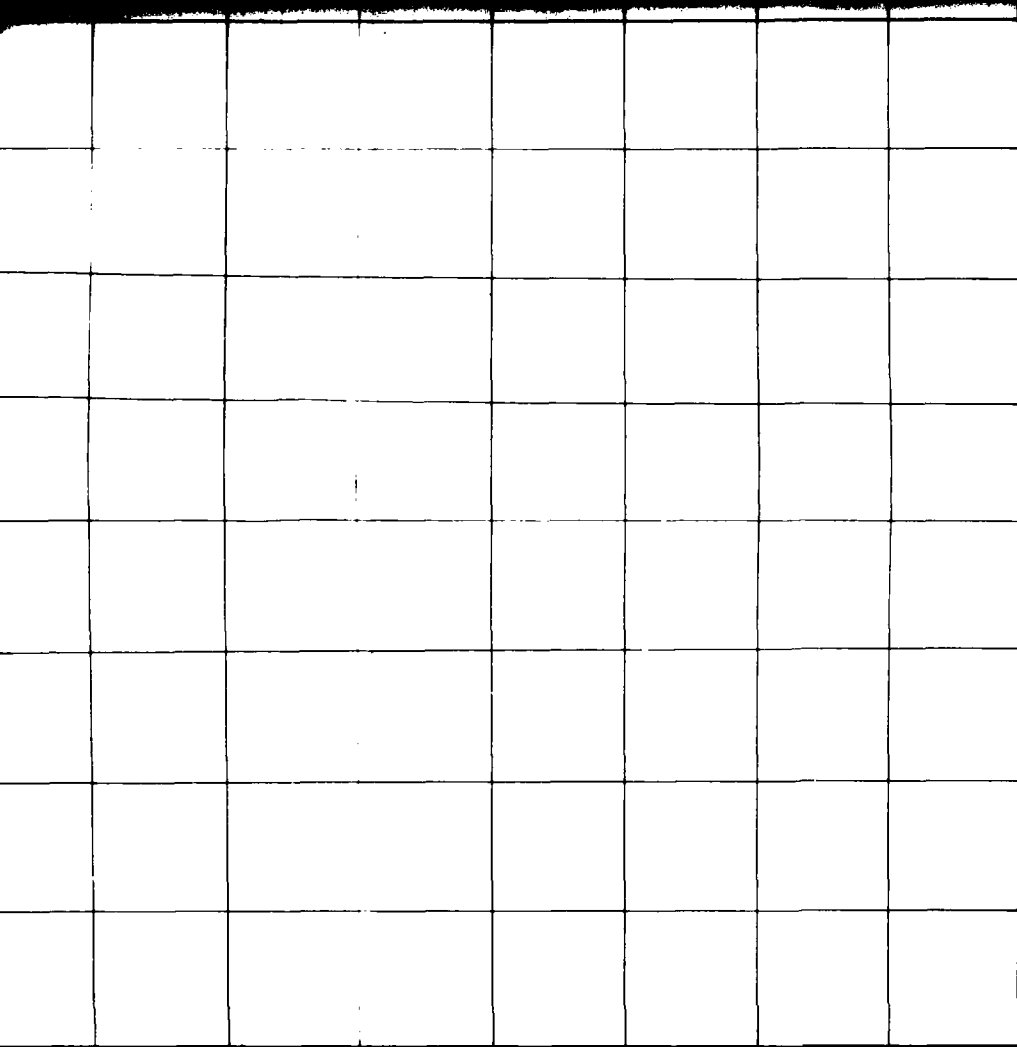
SP-SM

CS-47



800 900 (tsf)

800 900 (kg/cm²)



300 400 500 600 700 800 900 (tsf)
300 400 500 600 700 800 900 (kg/cm²)

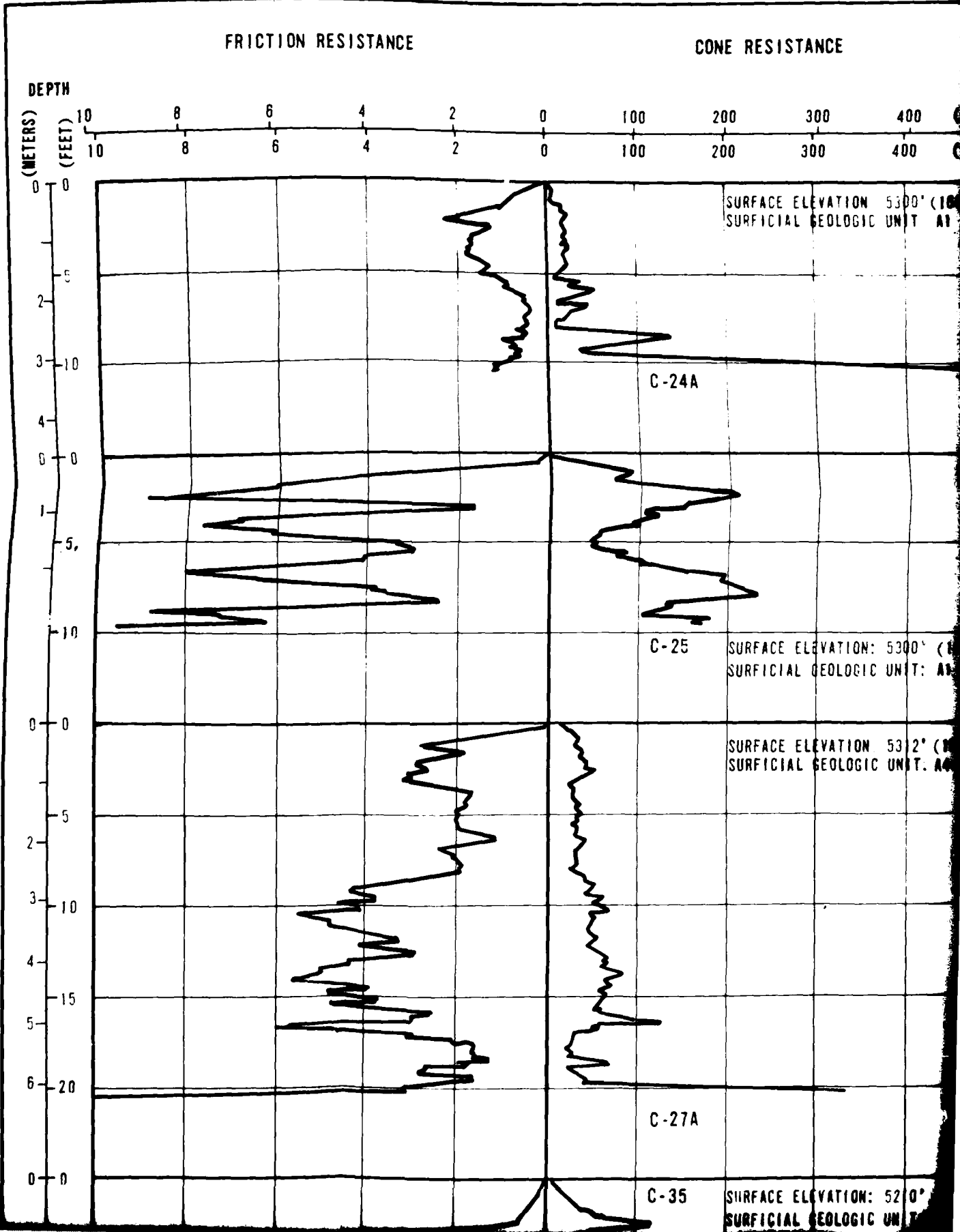
CONE PENETROMETER TEST RESULTS
VERIFICATION SITE
WHITE RIVER CDP, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

DRAWING
2
2 OF 3

FUGRO NATIONAL, INC.

FN-TR-27-V



2

FRICTION RESISTANCE

CONE

400 (kg cm²)

400 (tsf)

SOIL
COLUMN

DEPTH

(METERS)

(FEET)

10
10

8
8

6
6

4
4

2
2

0
0

100
100

200
200

SON: 5300' (1615m)
LOGIC UNIT: A1

CS-24

CH

SM

CL

P-13

SON: 5300' (1615m)
LOGIC UNIT: A1

SON: 5312' (1619m)
LOGIC UNIT: A4o

CS-27

CH

SON: 5210' (1588m)

SC

CONE RESISTANCE

SOIL COLUMN

FRICION RESISTANCE

DEPTH

(METERS)

(FEET)

10
4
10

$$\begin{array}{r} 8 \\ 8 \end{array}$$

6
6

$$\frac{4}{4}$$
$$\frac{2}{2}$$

438

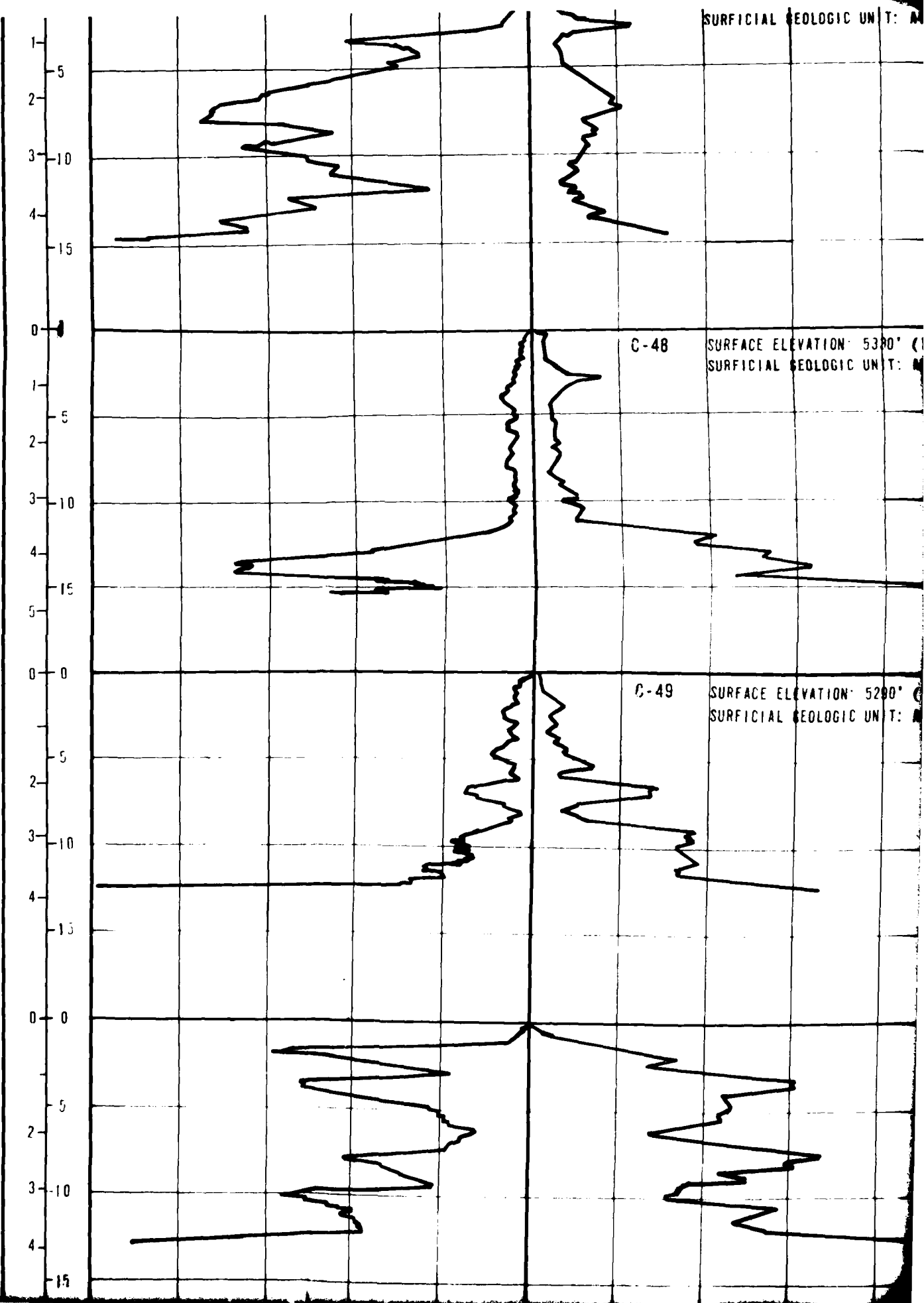
CTION RESISTANCE

CONE RESISTANCE

Figure 1 shows a horizontal scale for measuring pressure. The scale has two rows of markings. The top row is labeled (kg/cm^2) and has markings at 6, 4, 2, 0, 100, 200, 300, and 400. The bottom row is labeled (tsf) and has markings at 6, 4, 2, 0, 100, 200, 300, and 400. The scale is marked with vertical lines and numbers.

**SOIL
COLUMN**

5



CS-35

6

SM

P-8

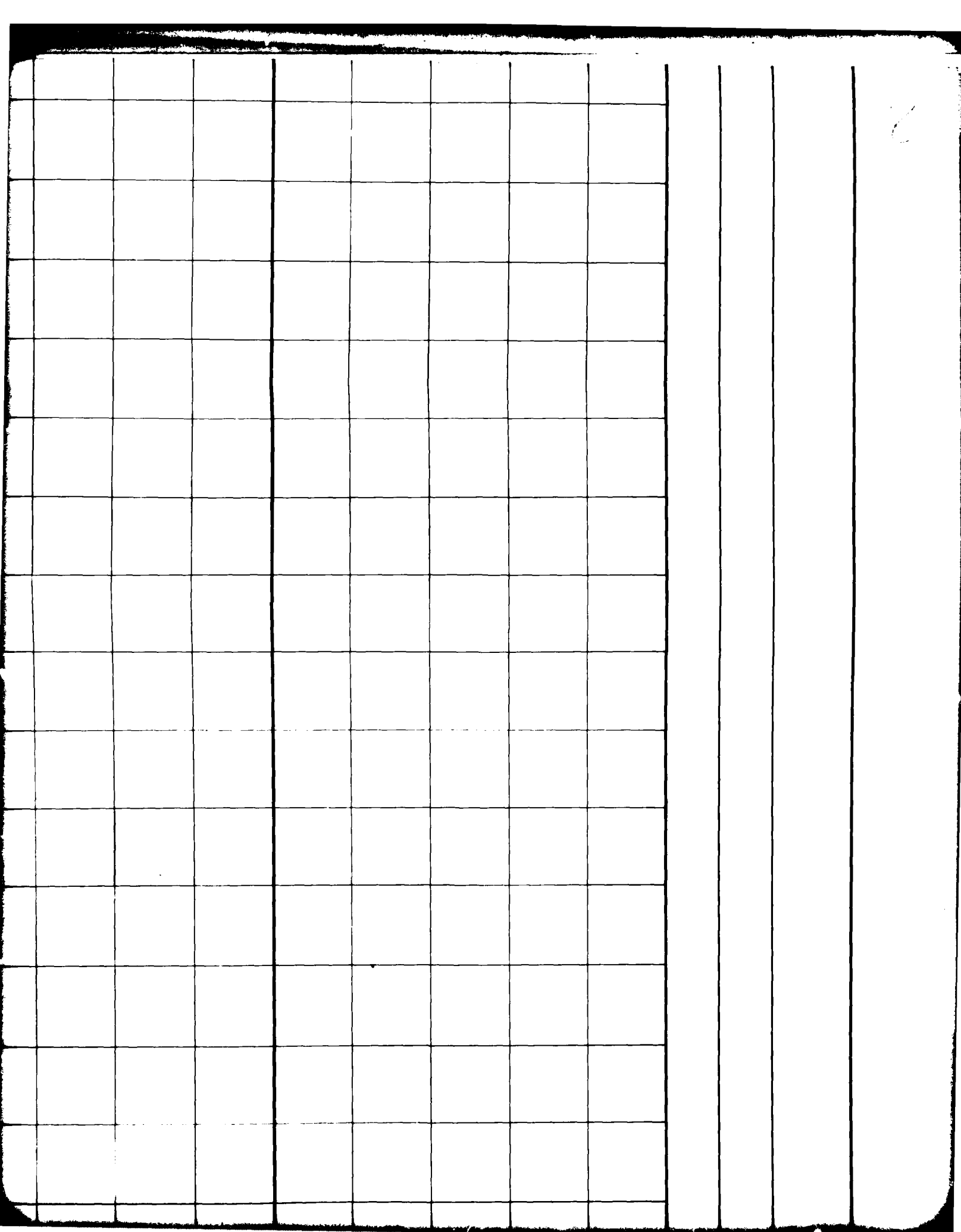
CS-49

ML

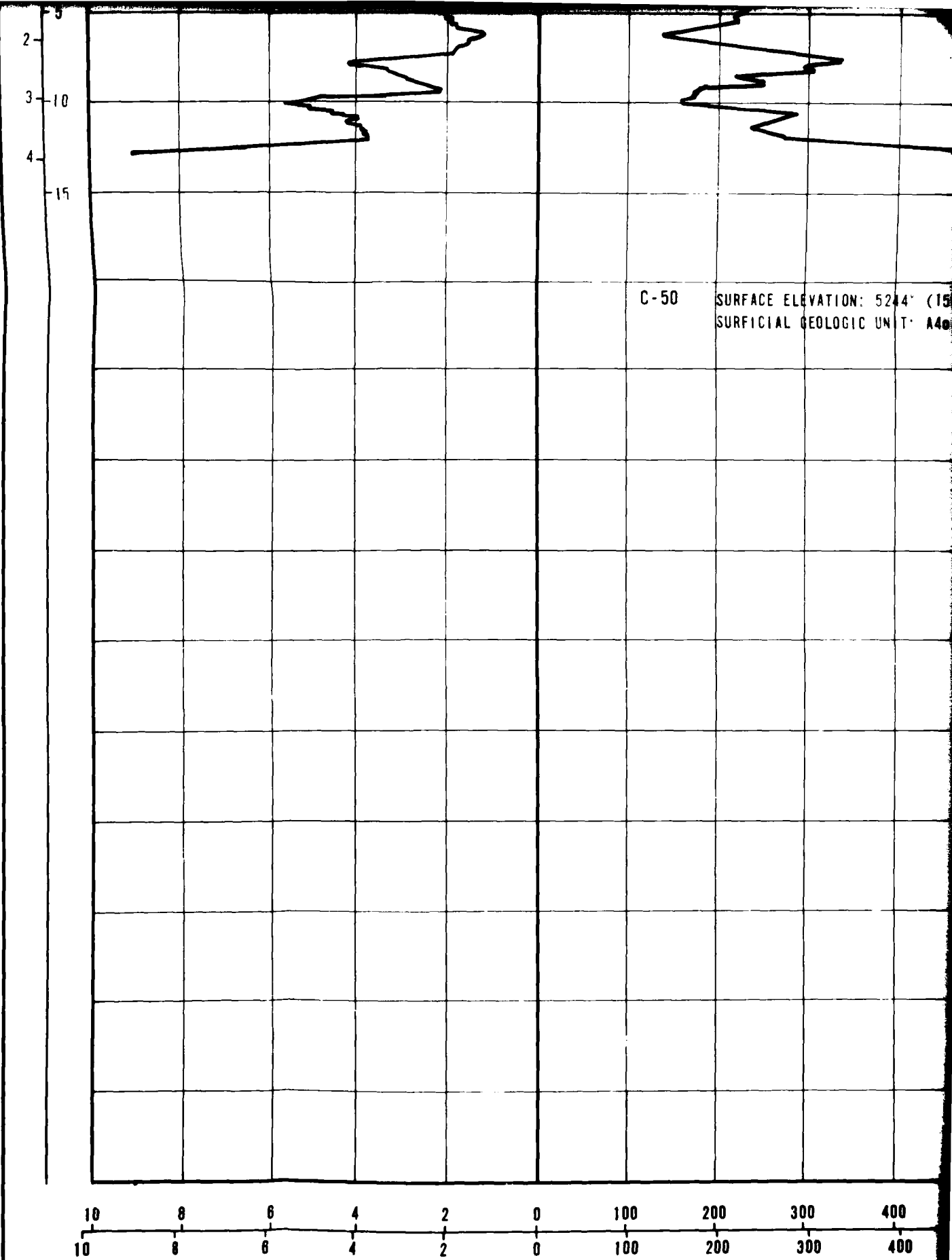
CS-50

SC

7



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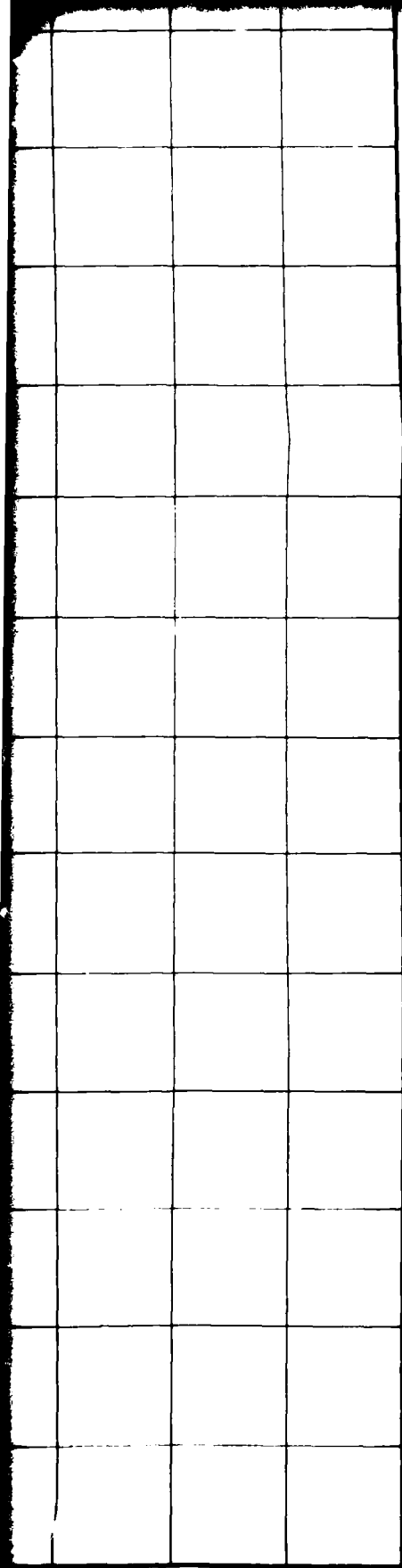
2 JUL 79

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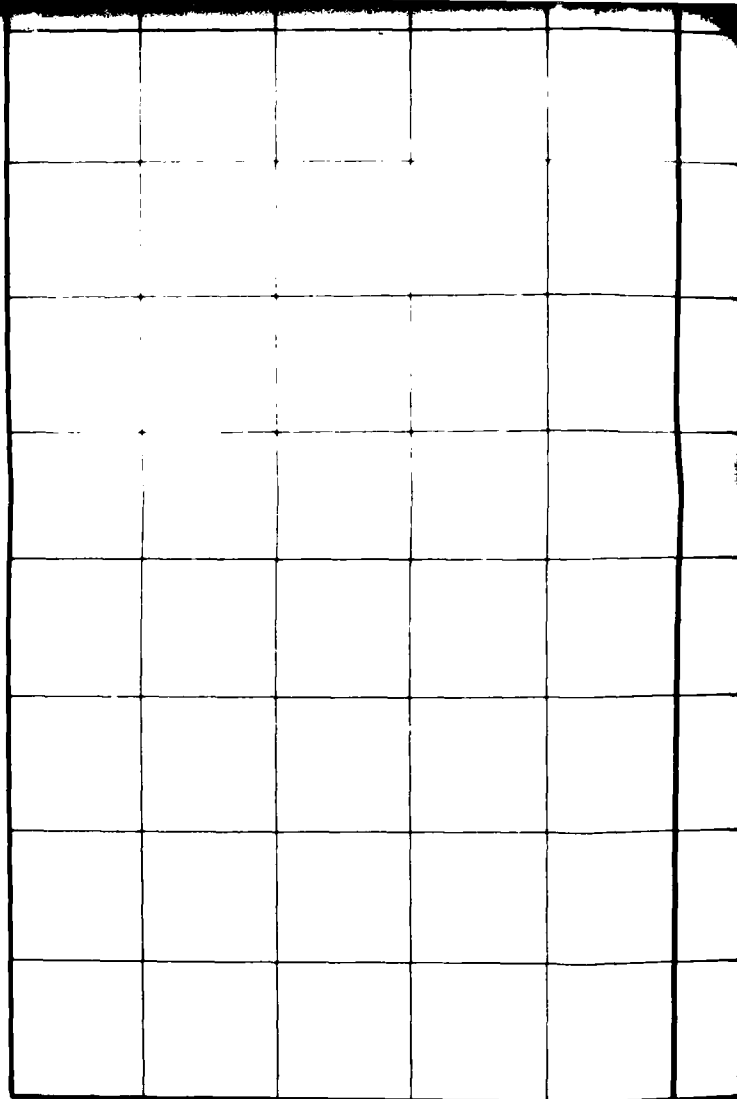
400 (151)
400 (kg cm²)

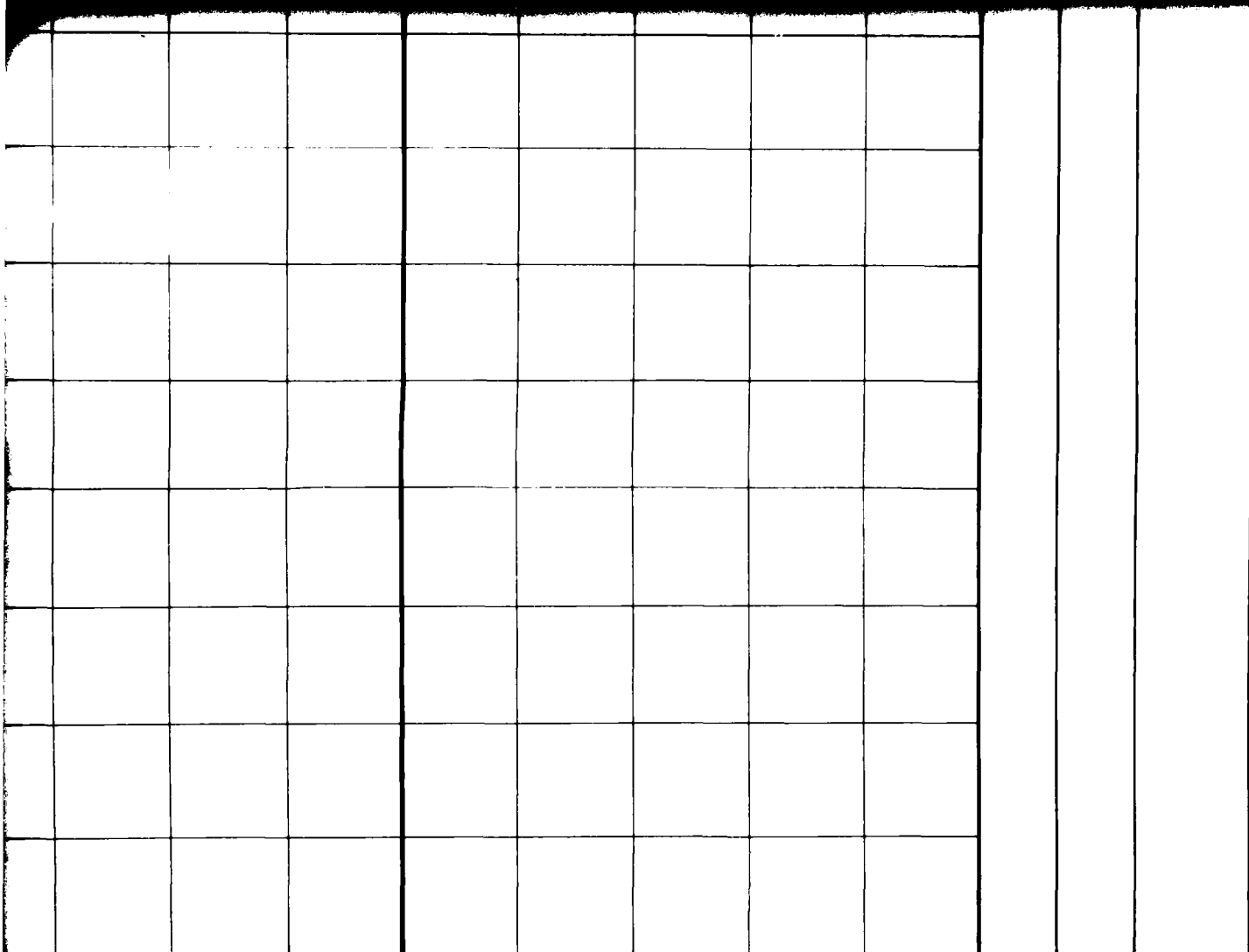
10	8	6	4	2	0	100	200
10	8	6	4	2	0	100	200



200 300 400 (tsf)

200 300 400 (kg/cm²)





6	4	2	0	100	200	300	400	(tsf)
6	4	2	0	100	200	300	400	(kg/cm ²)

FRICION RESISTANCE TEST RESULTS
VERIFICATION SITE
WHITE RIVER COP. NEVADA

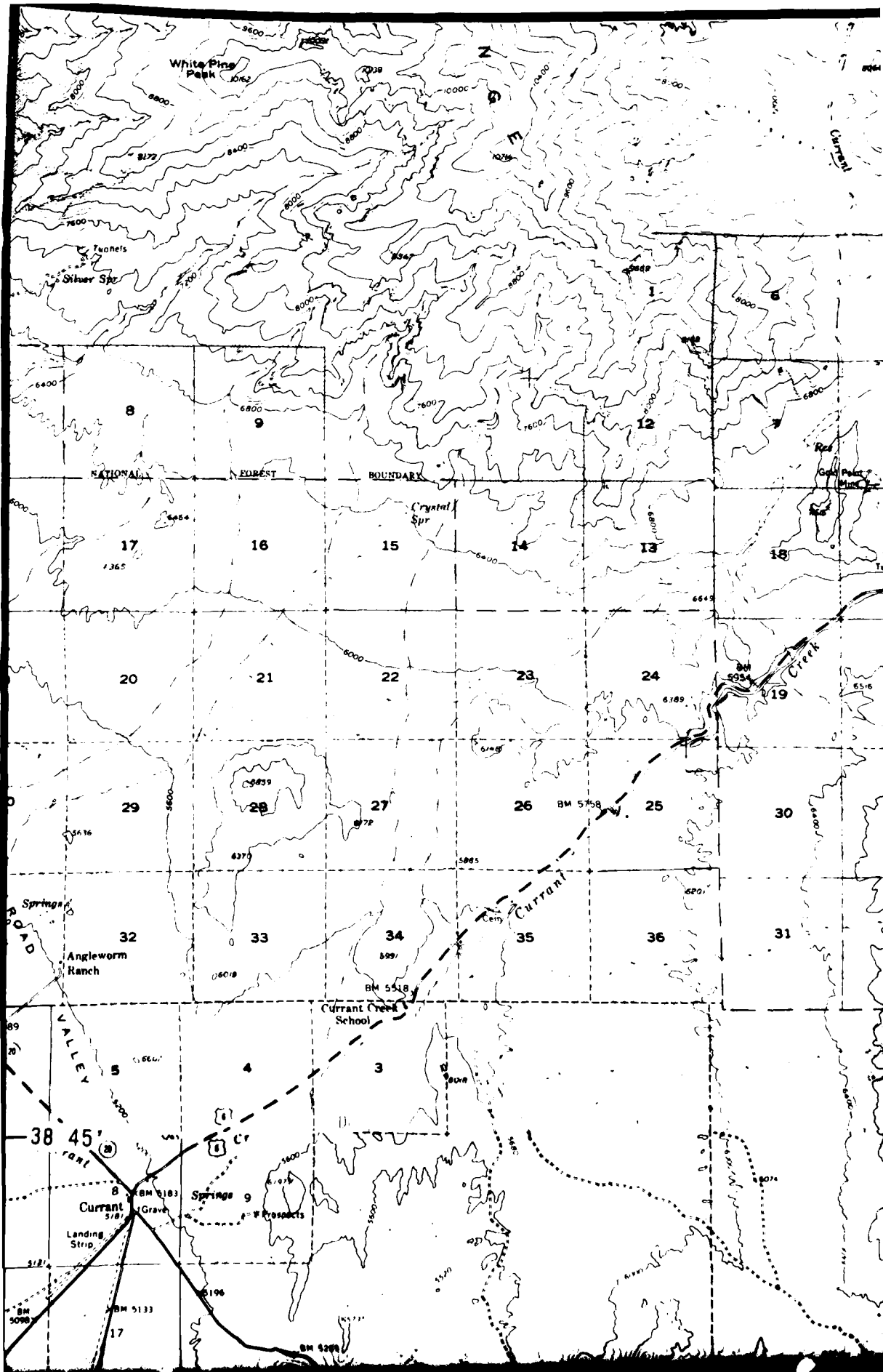
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

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2

3 OF 3

FUGRO NATIONAL, INC.



AD-A113 327

FUGRO NATIONAL INC LONG BEACH CA

F/G 8/13

MX SITING INVESTIGATION. GEOTECHNICAL EVALUATION. VOLUME V. NEV--ETC(U)

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FN-TR-27-5

NL

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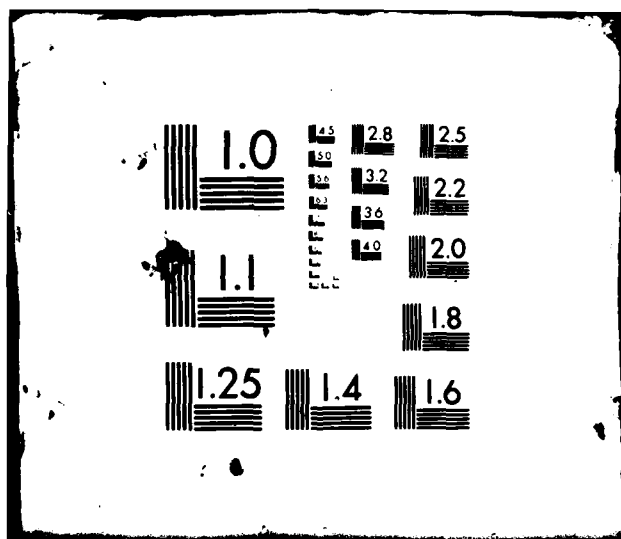
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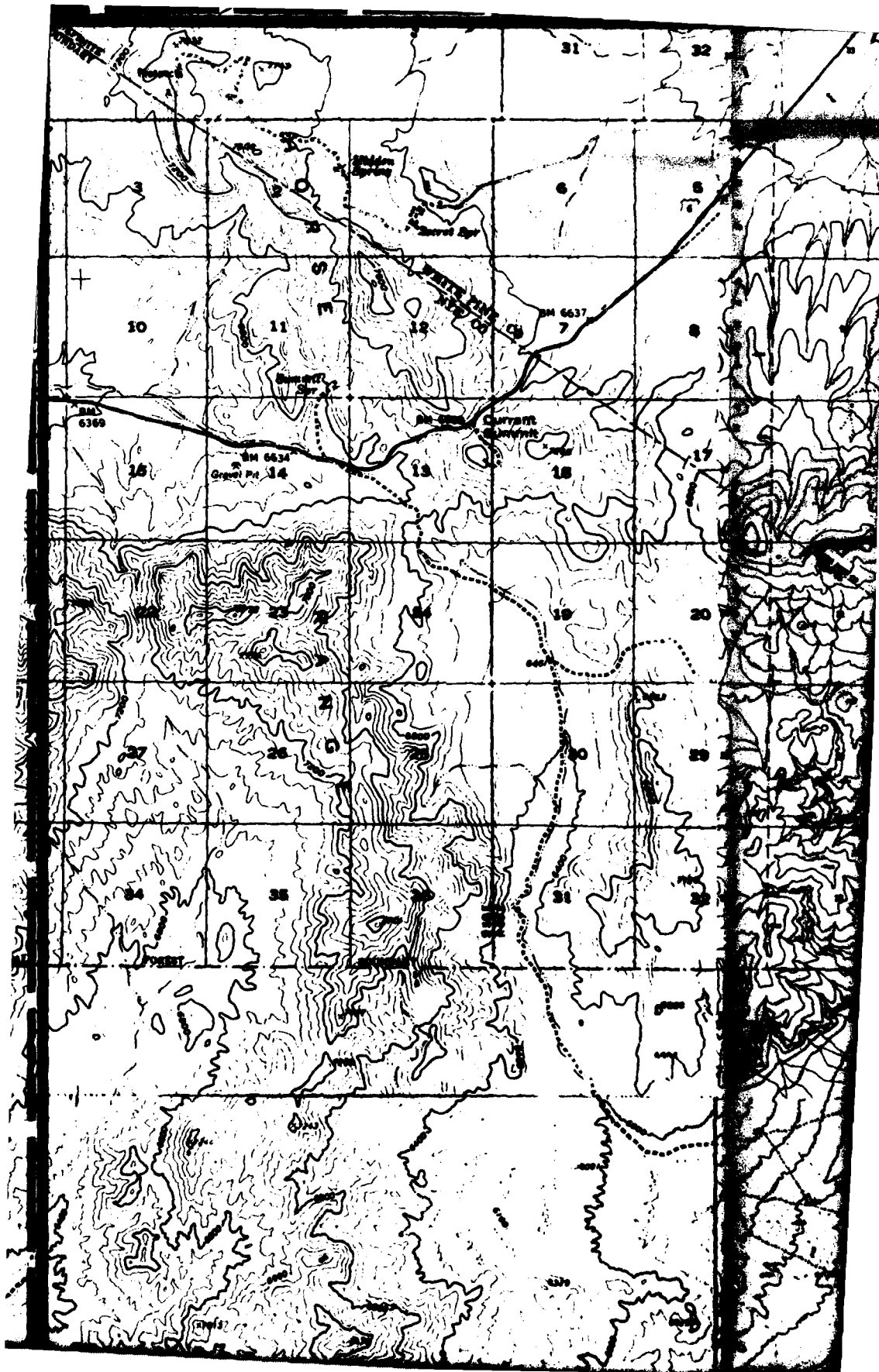
DATE

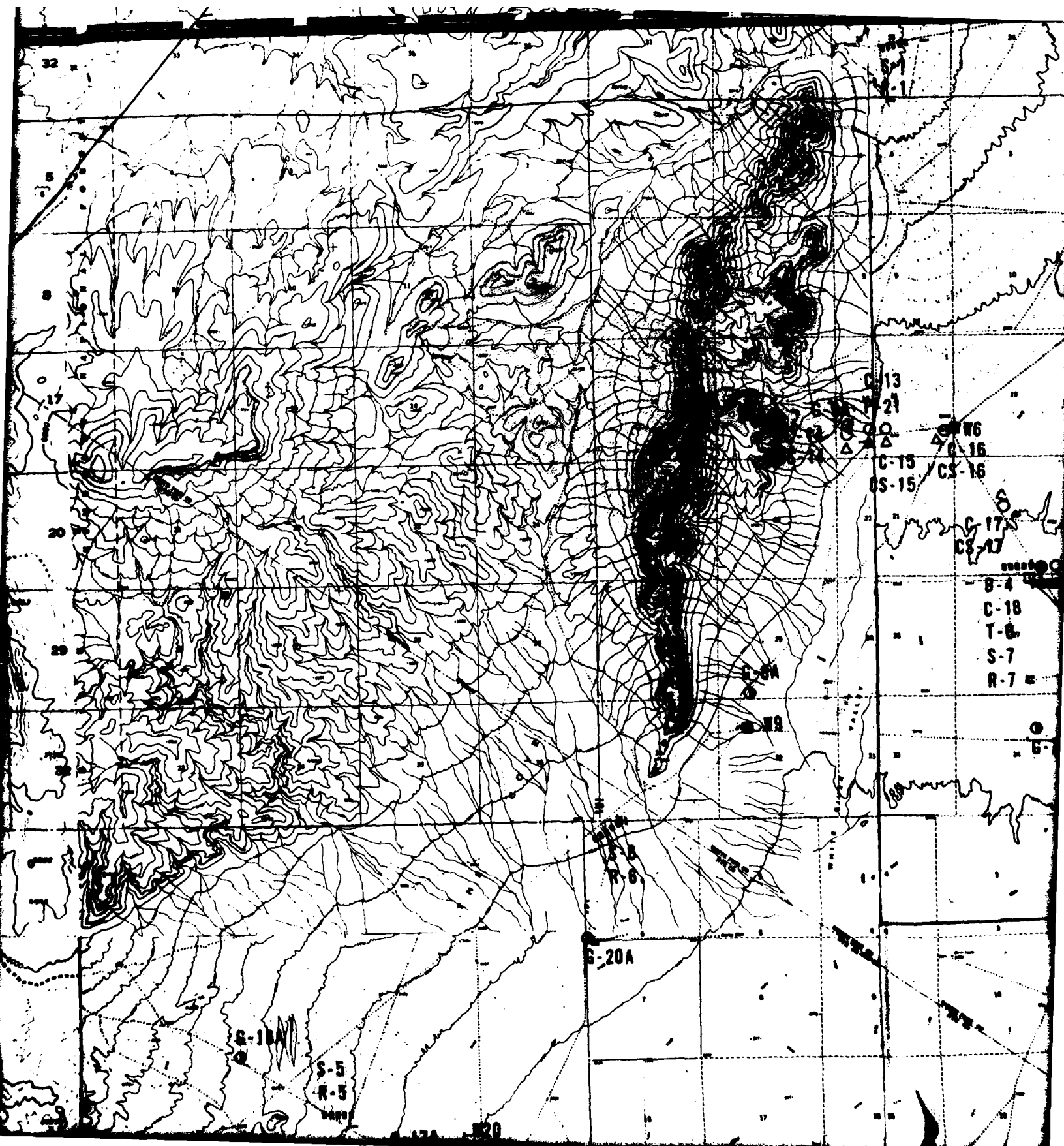
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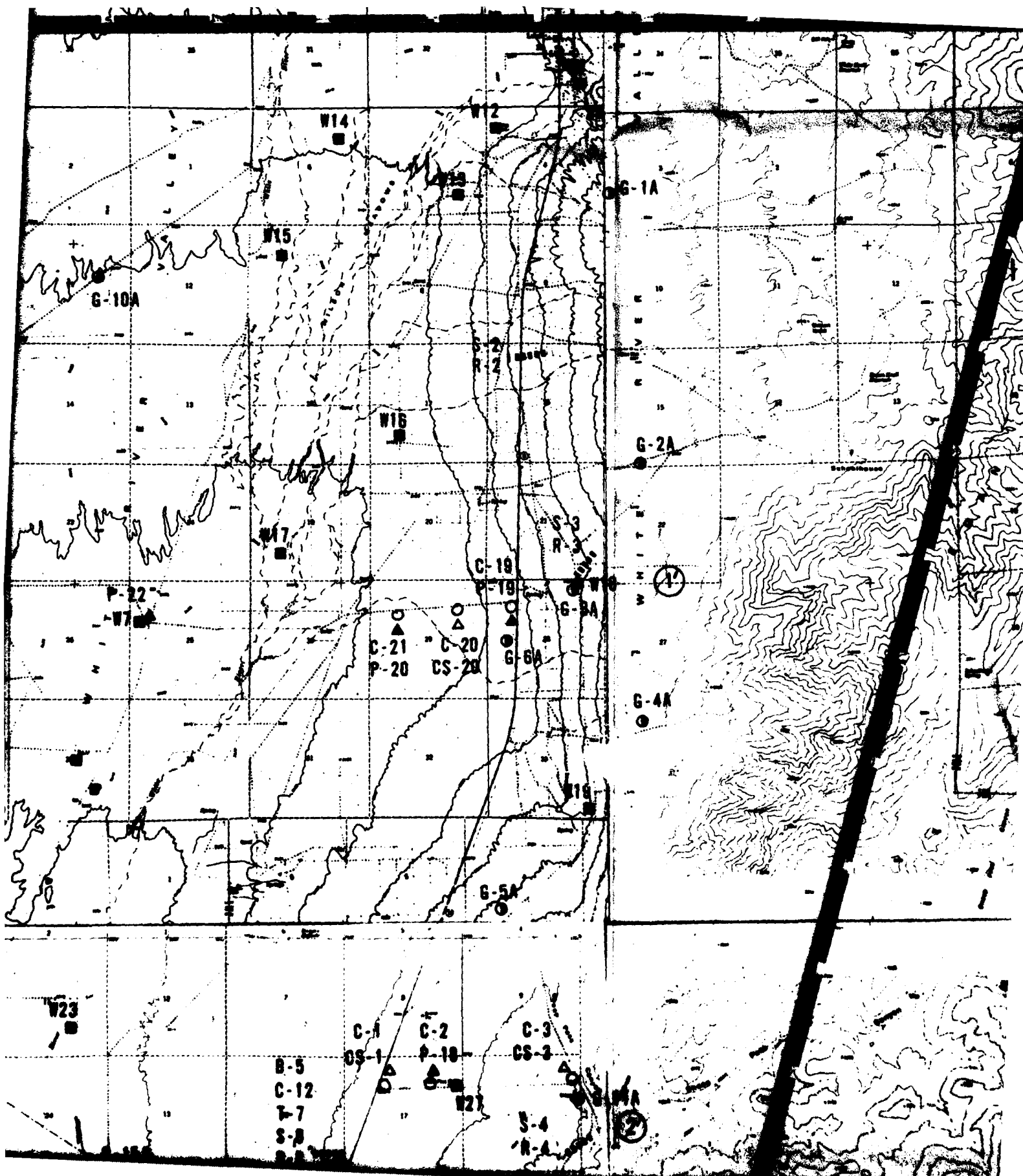
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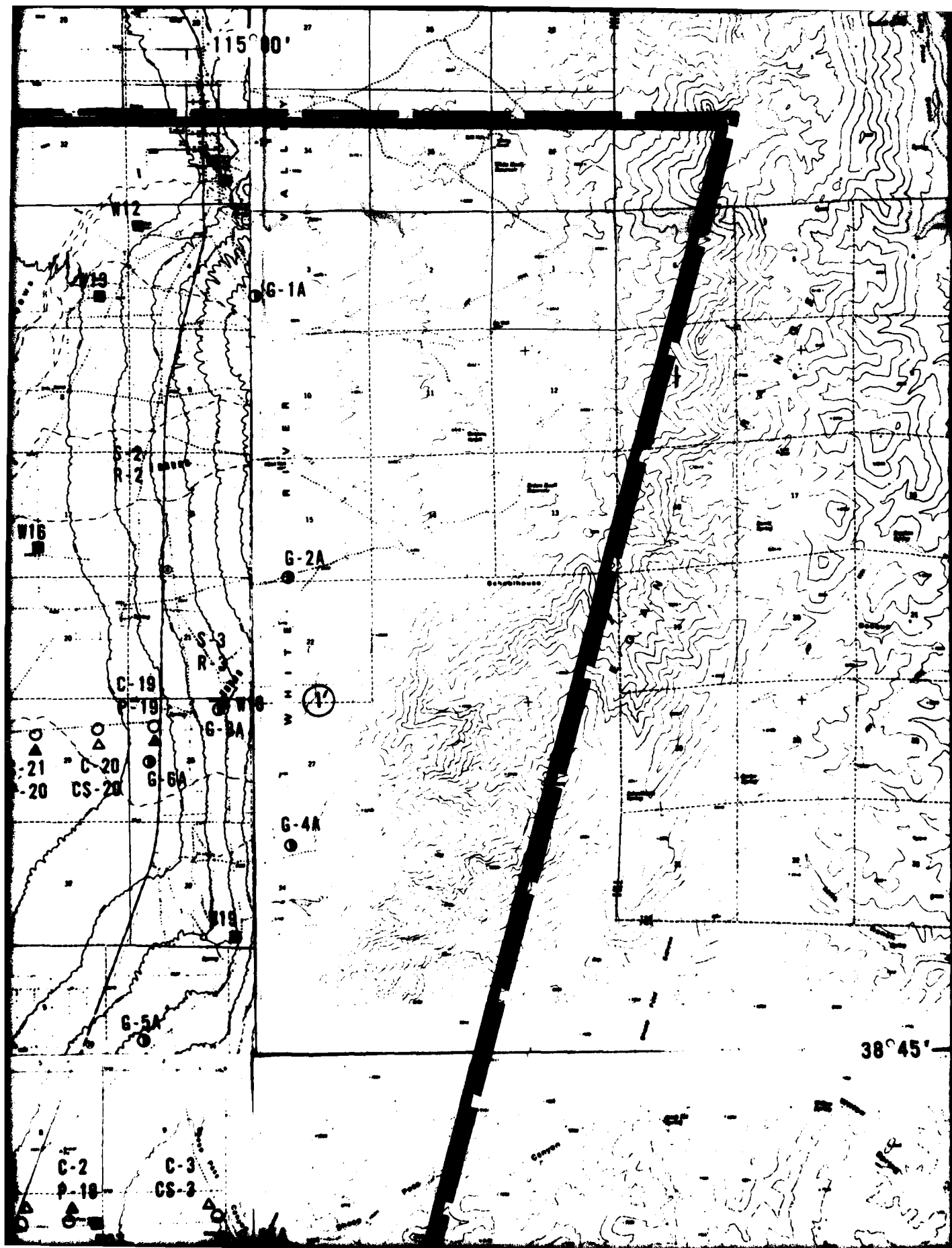
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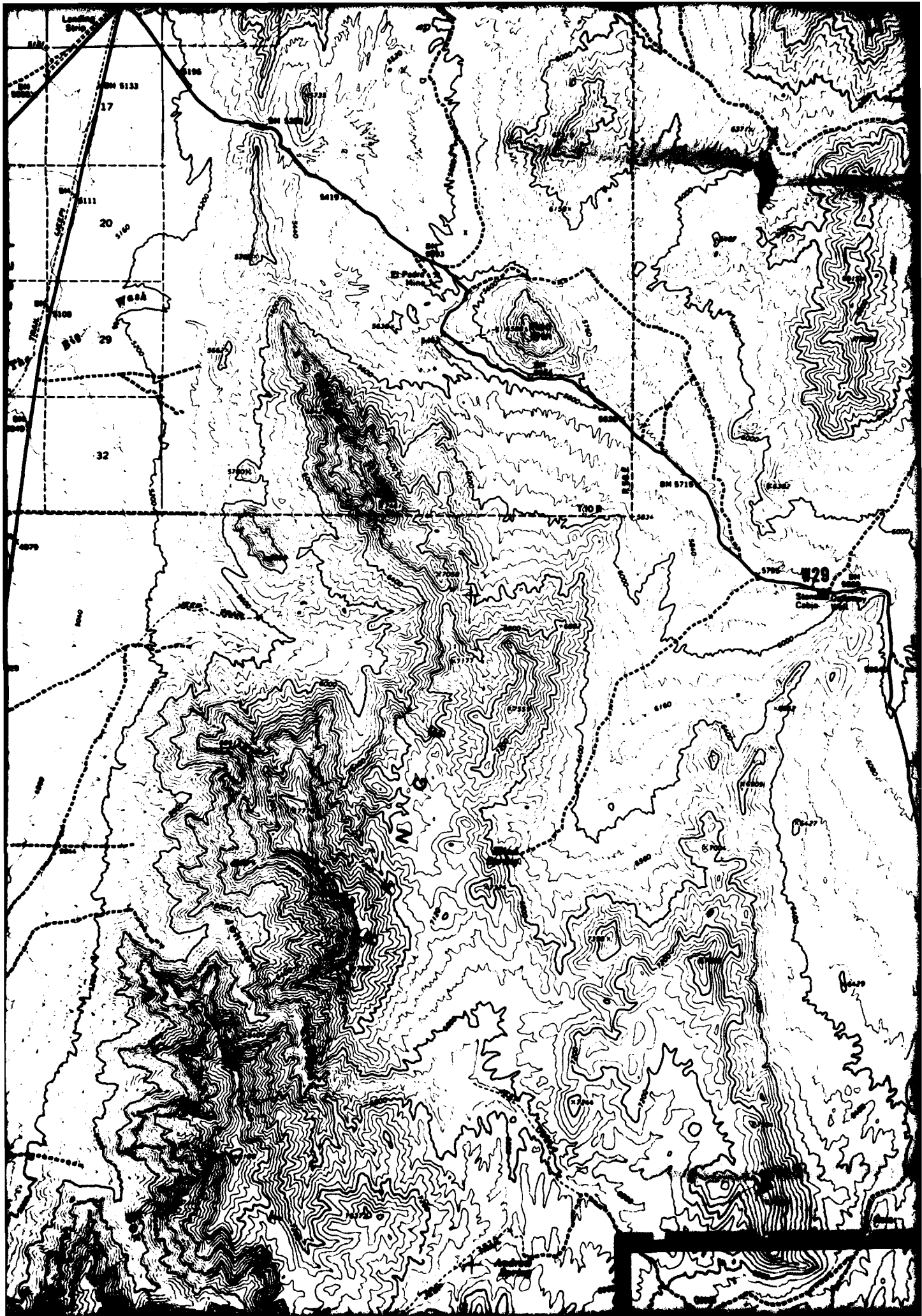


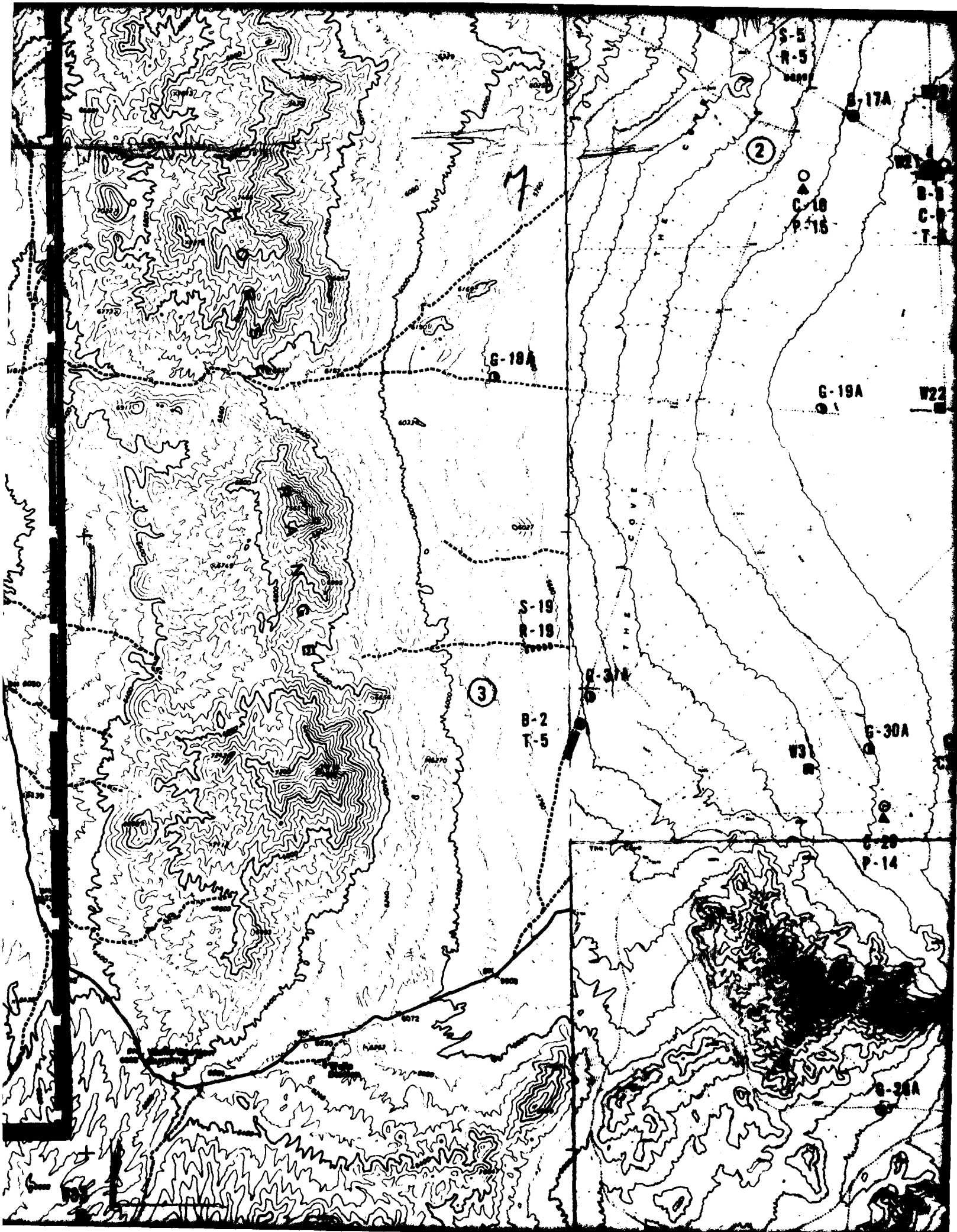


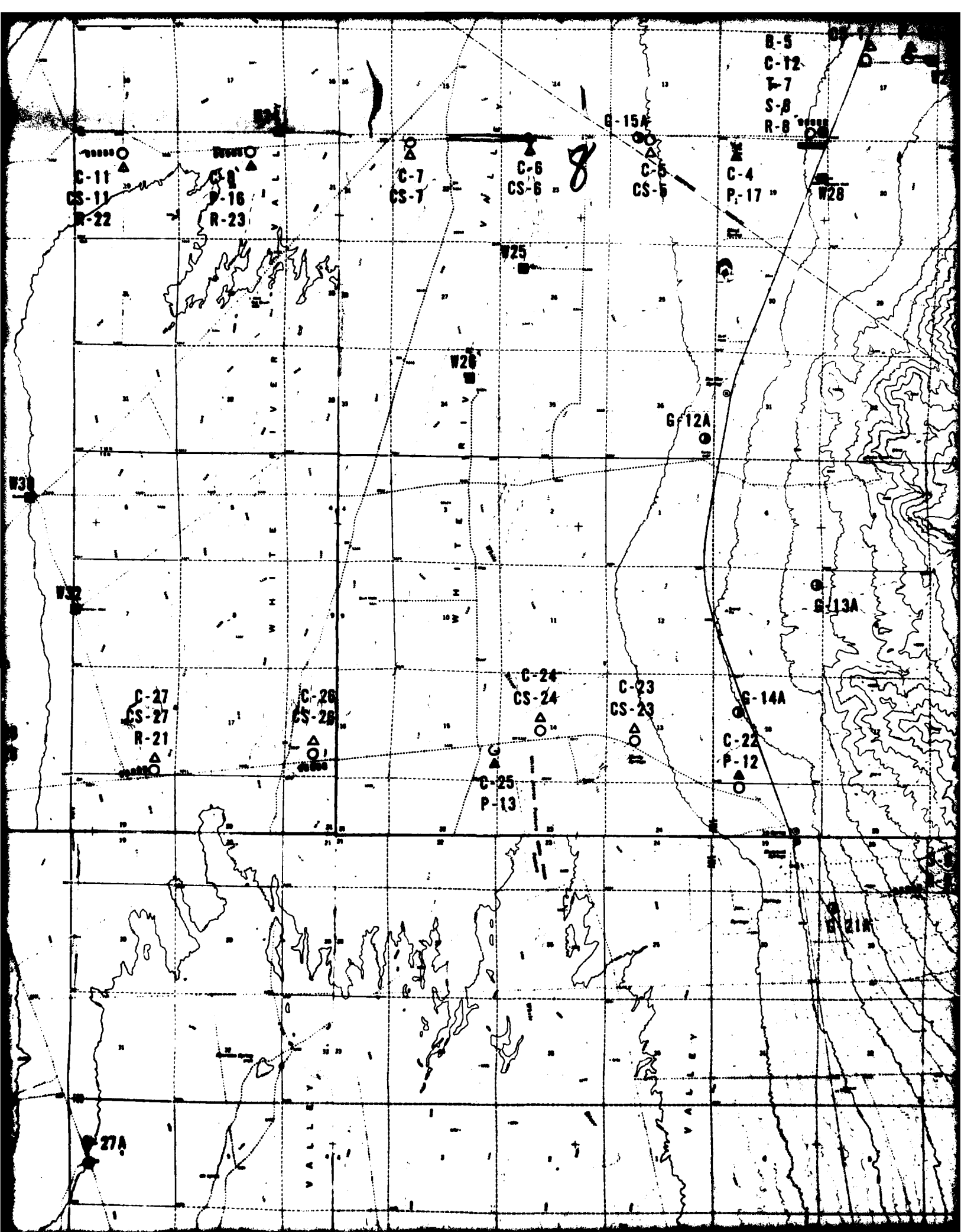


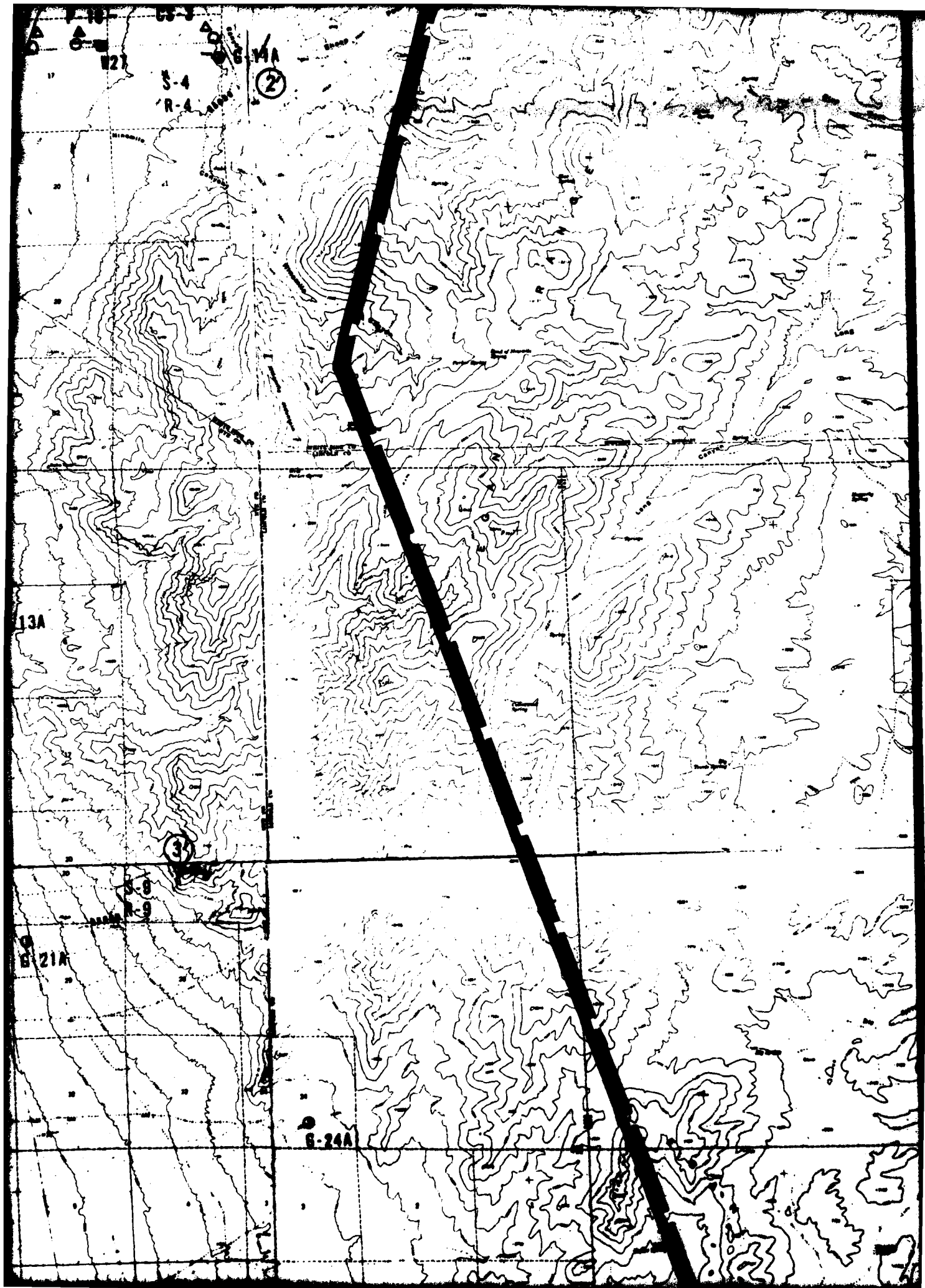


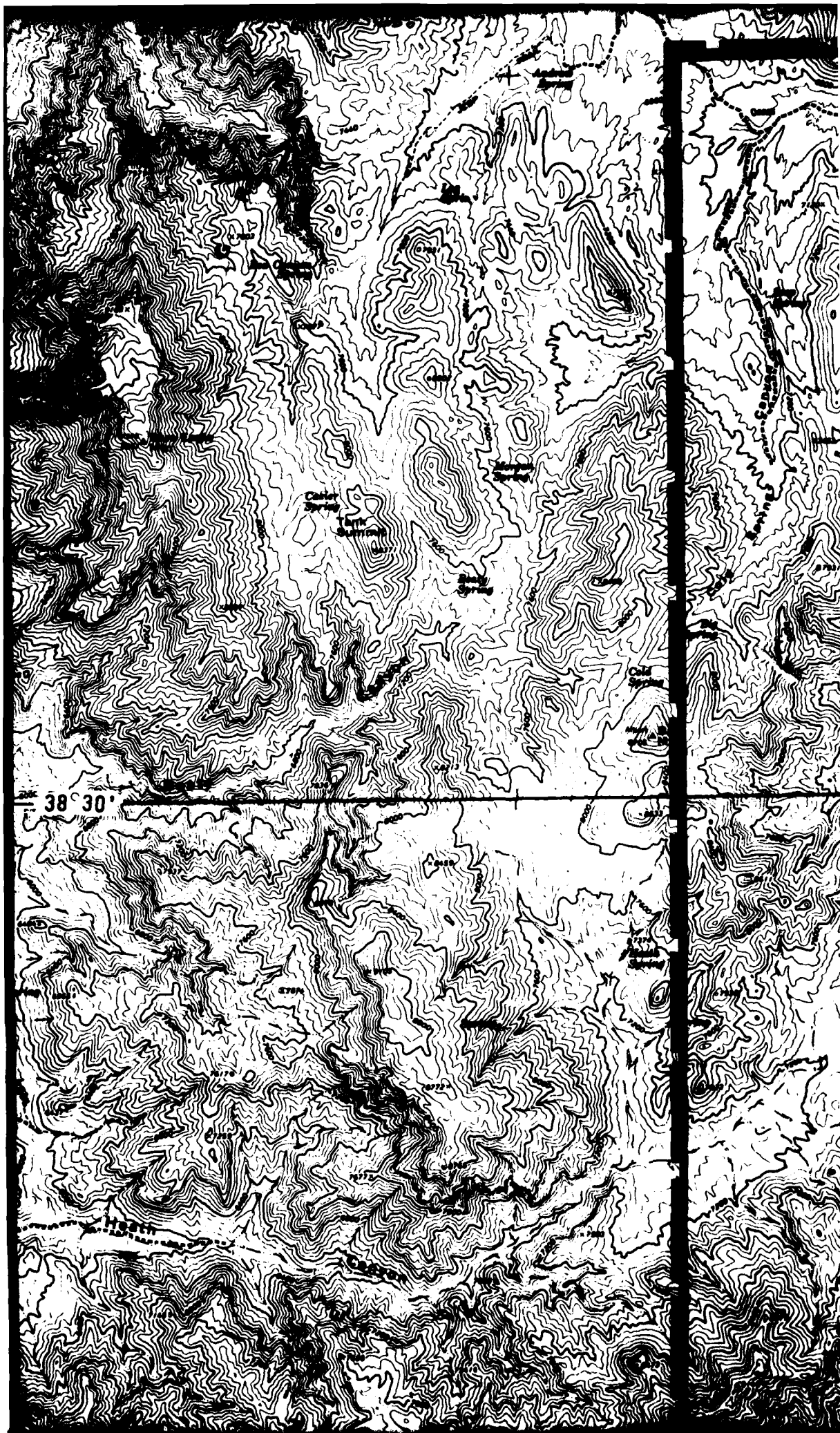


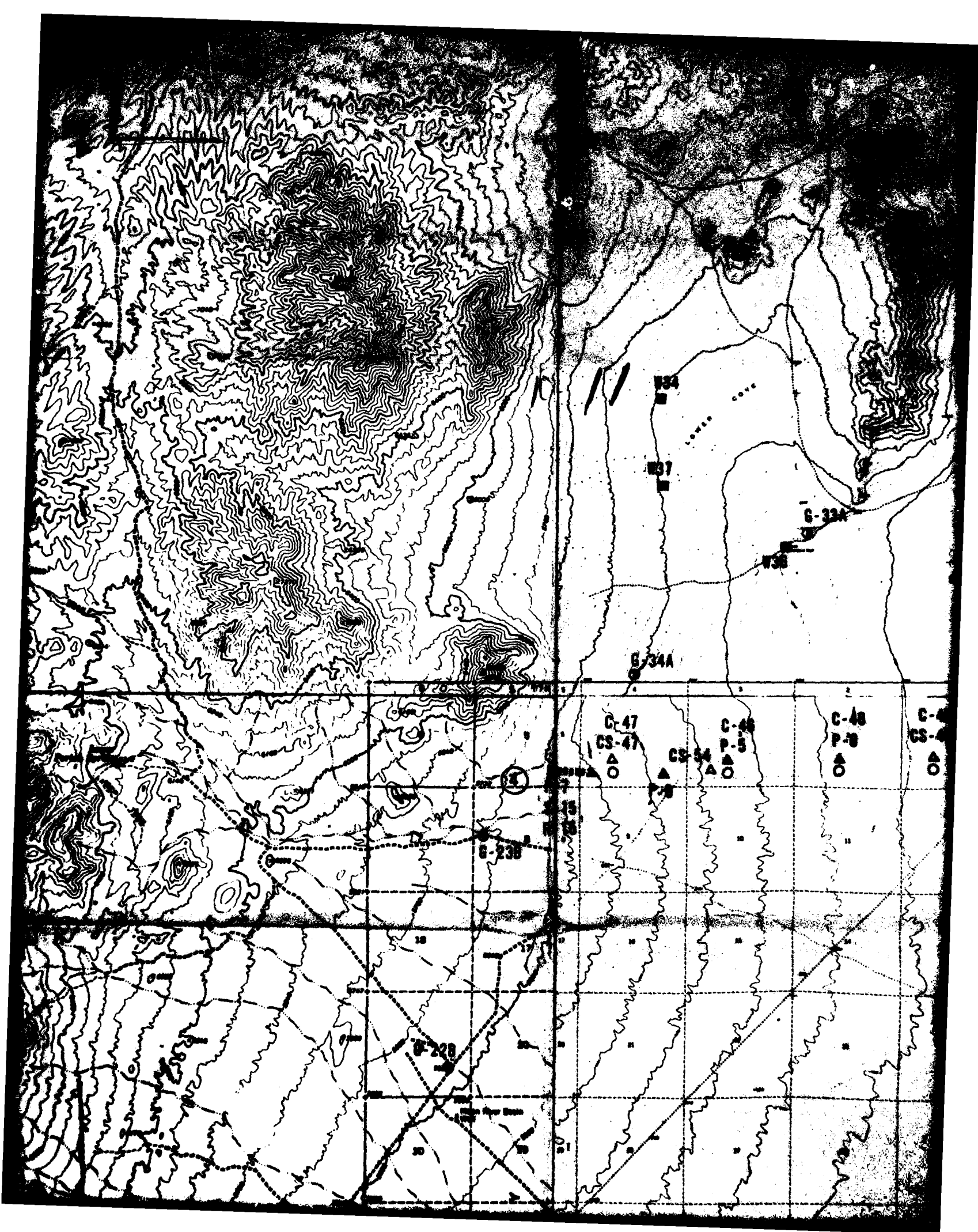


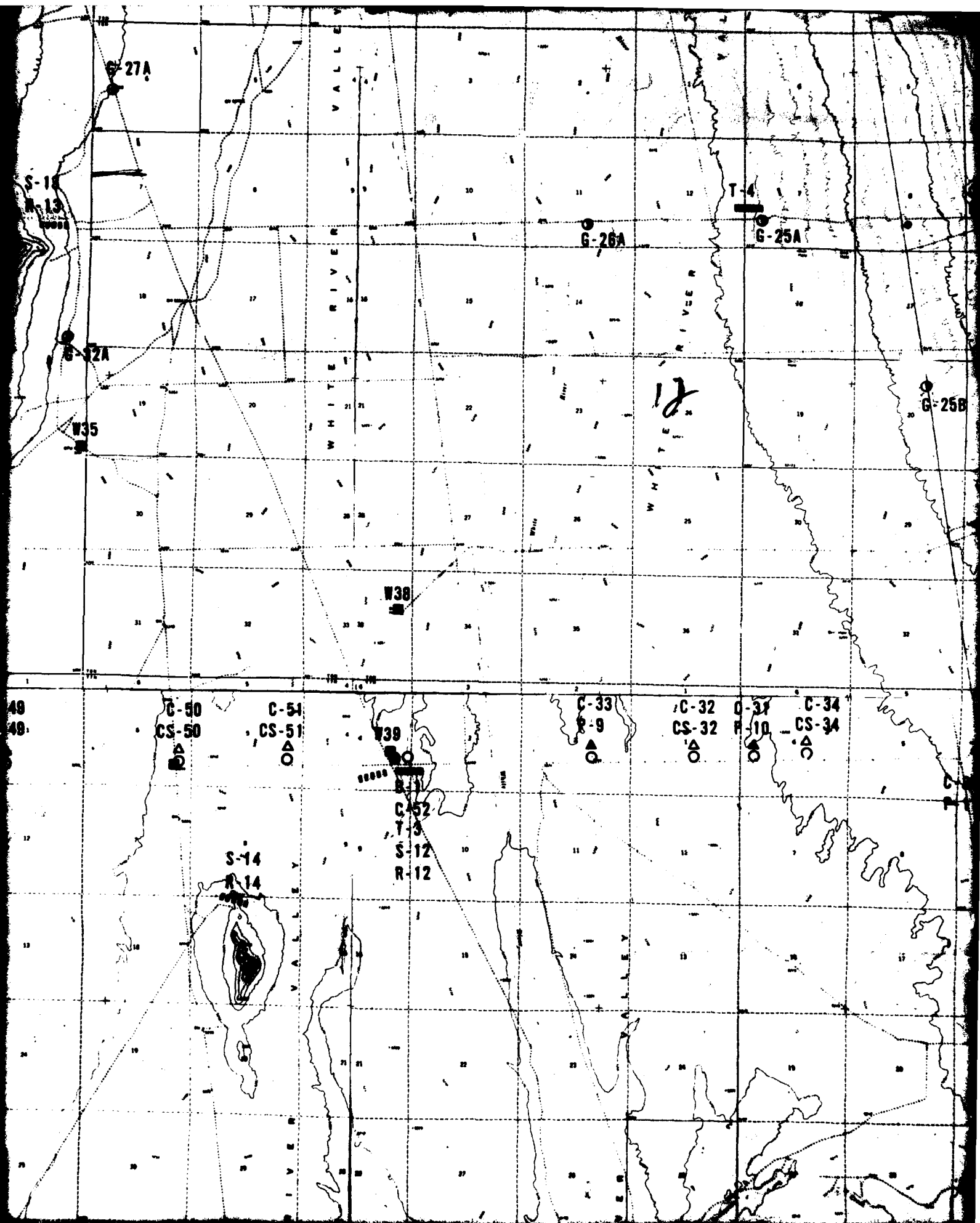


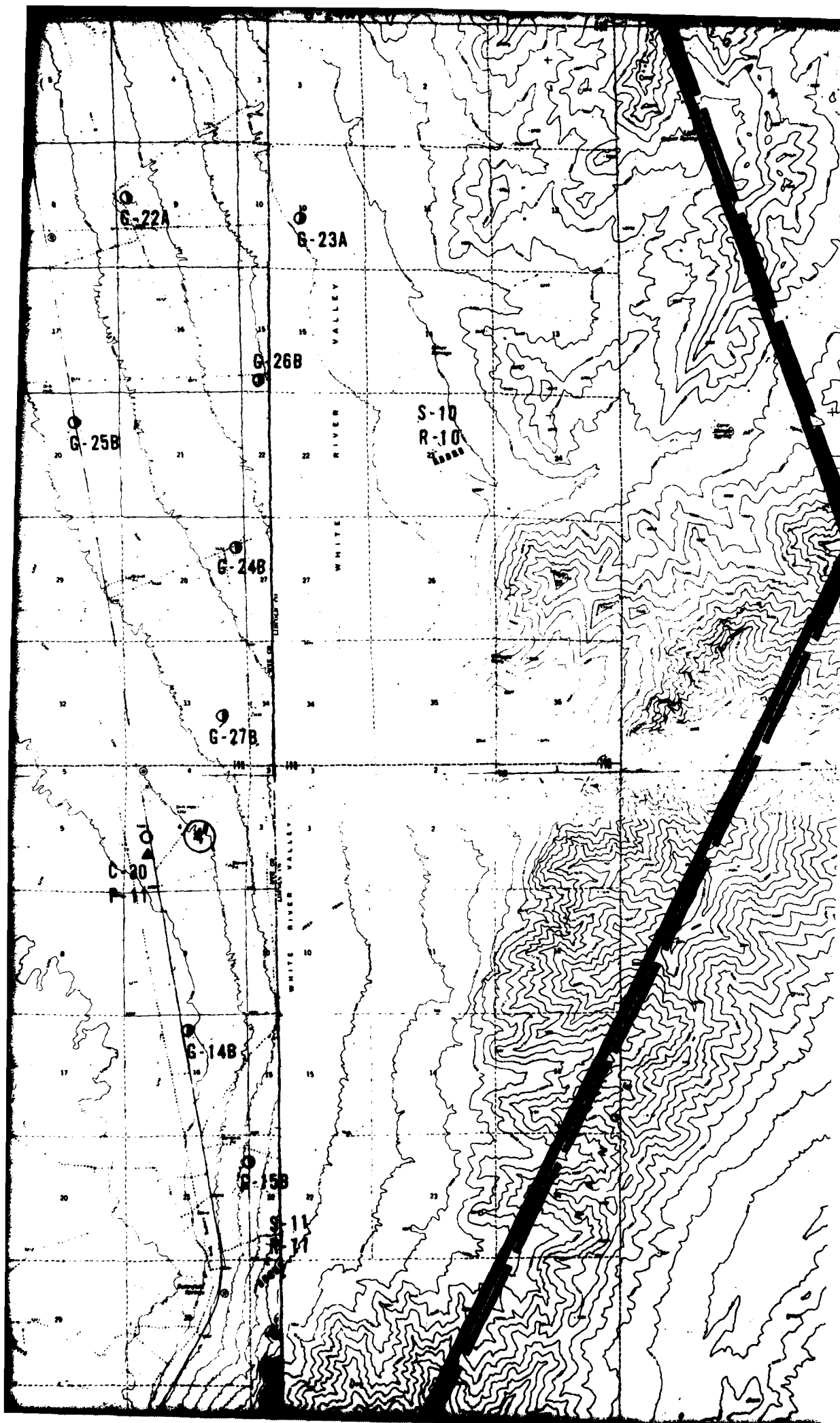


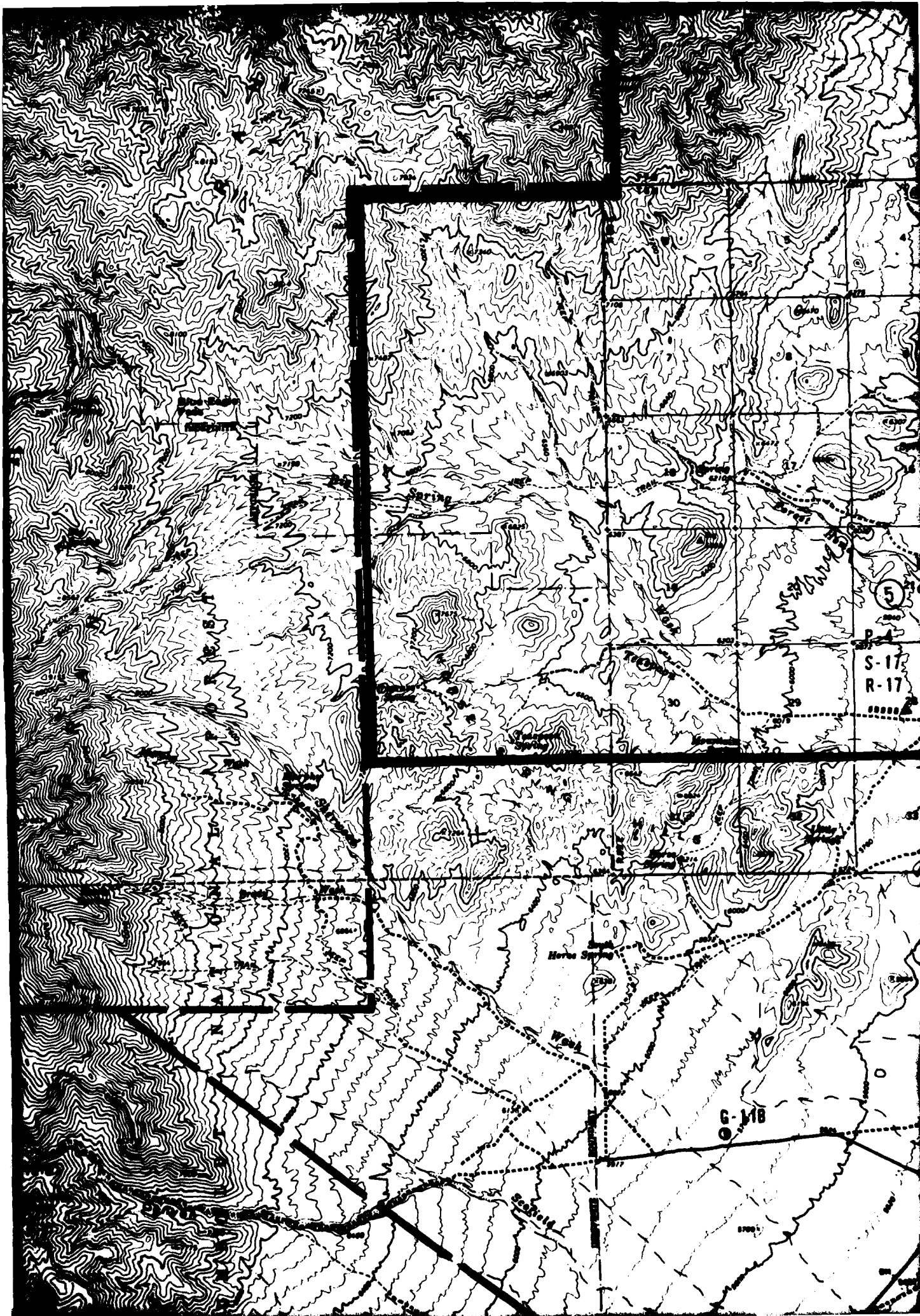


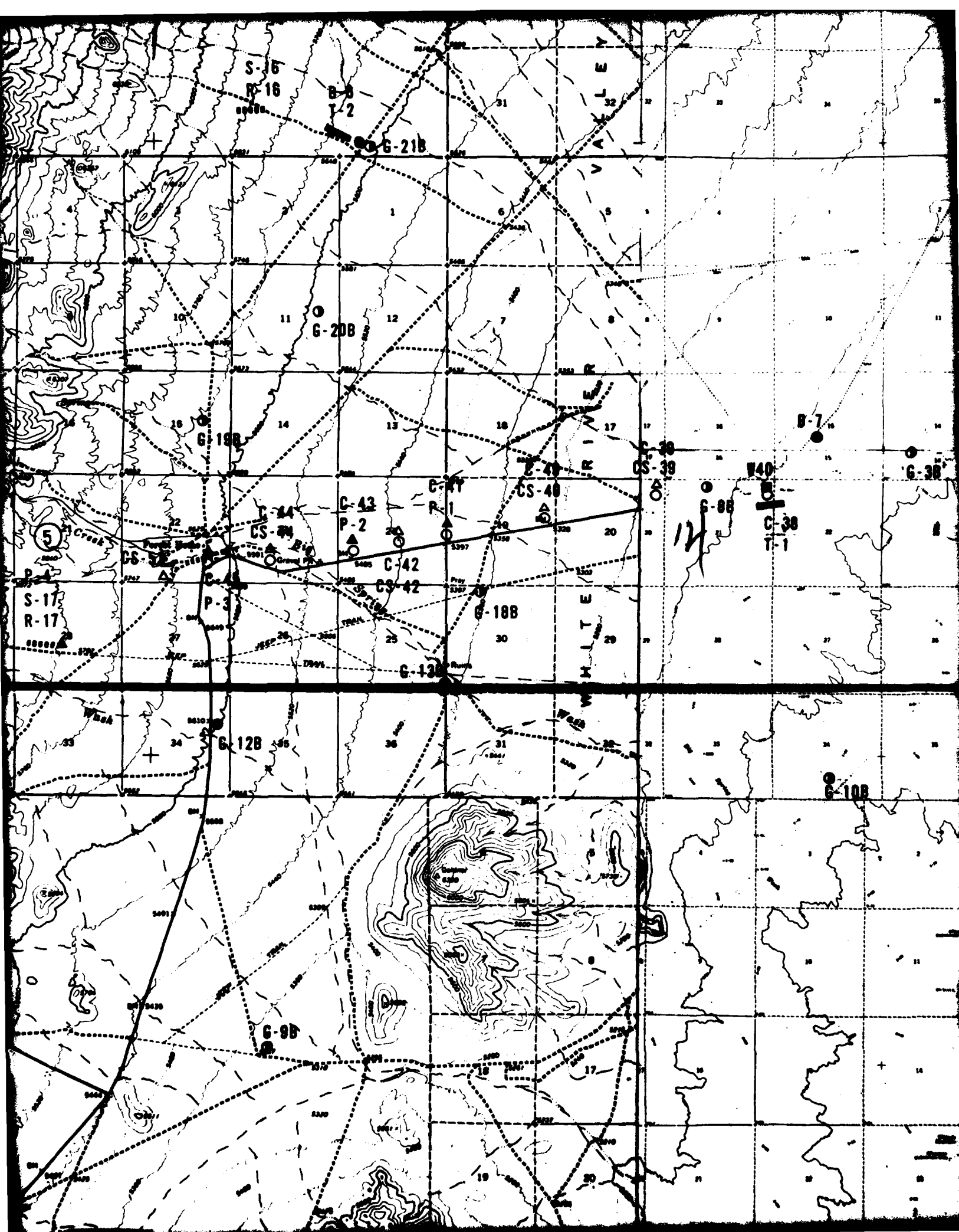


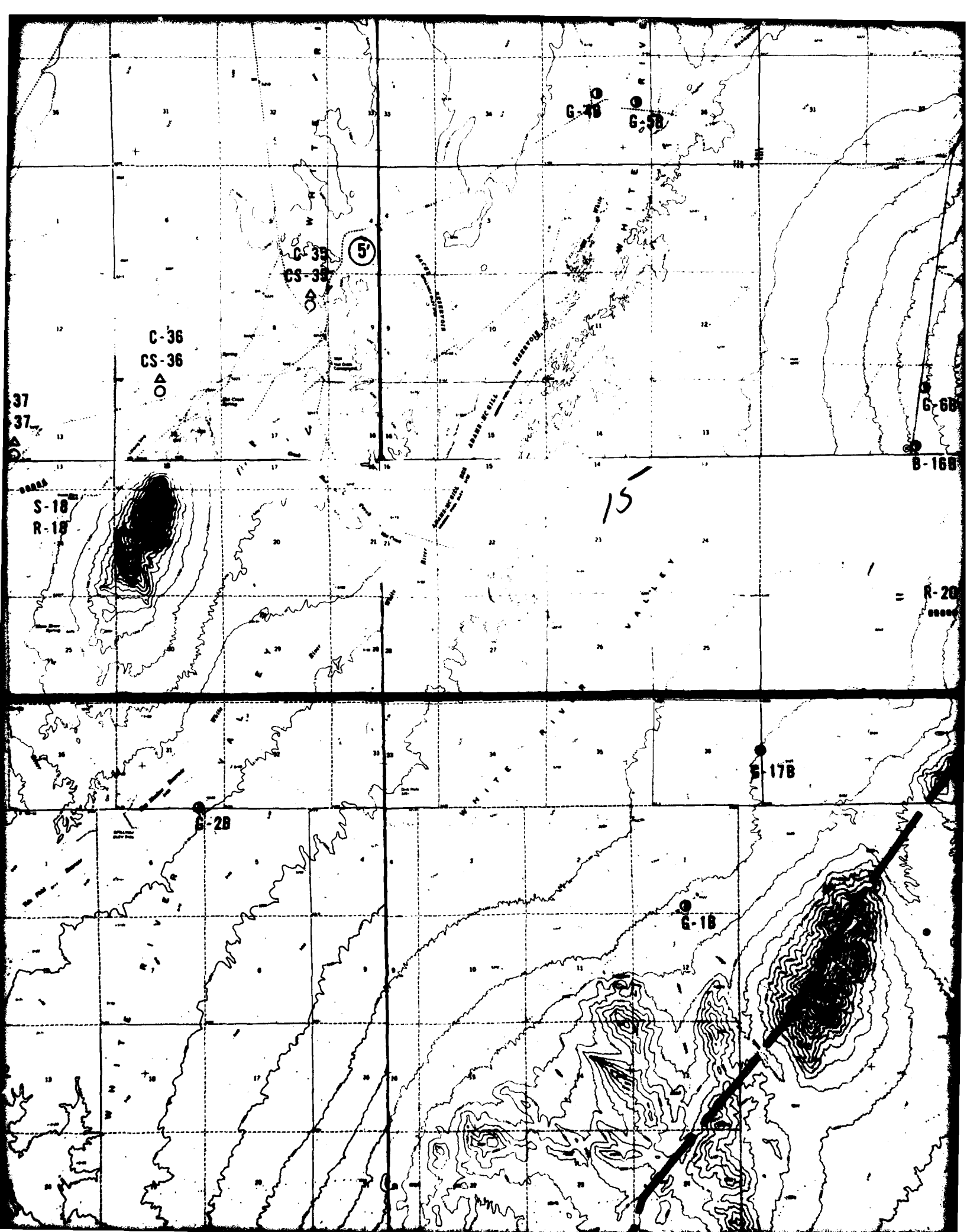


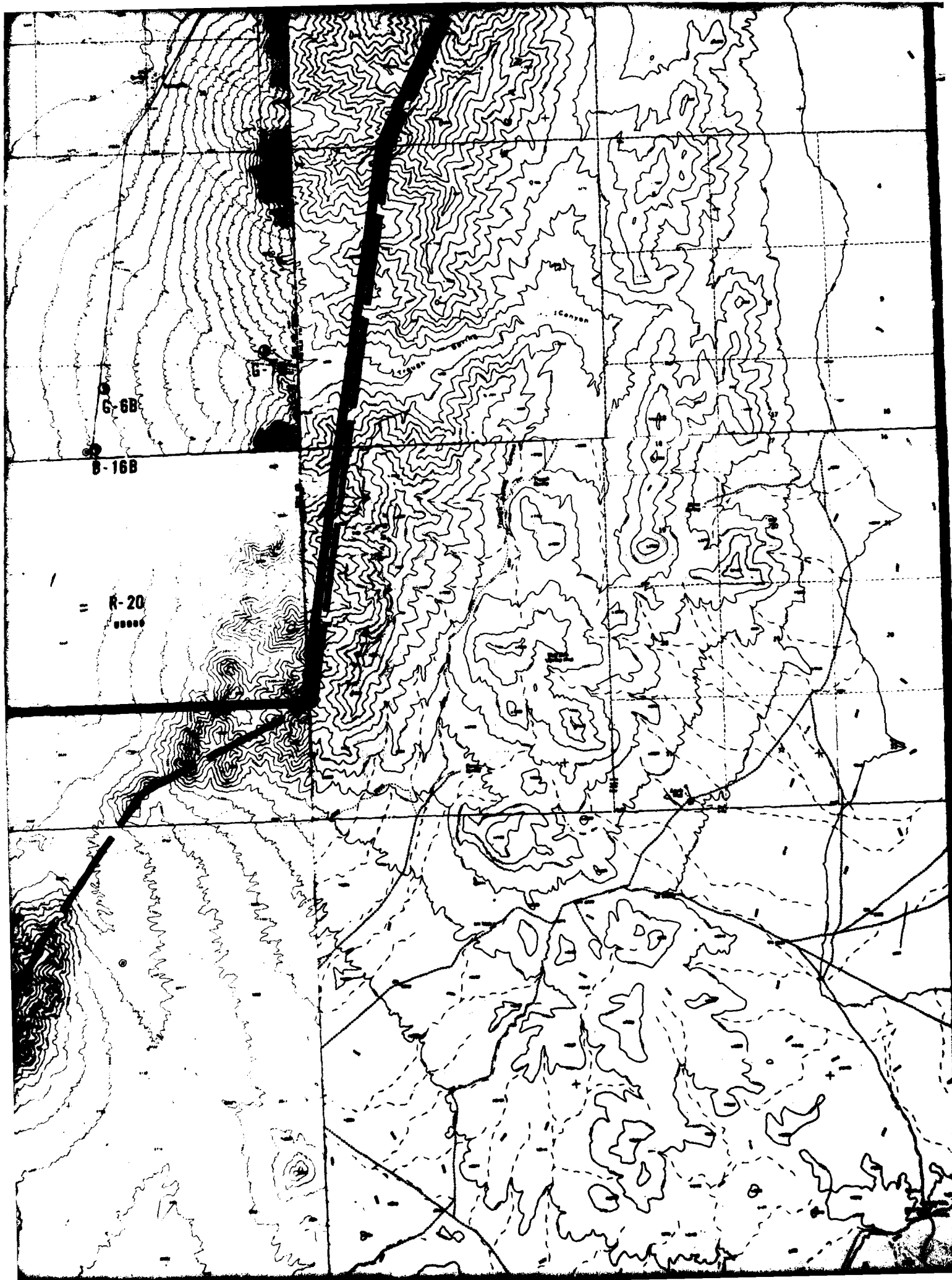






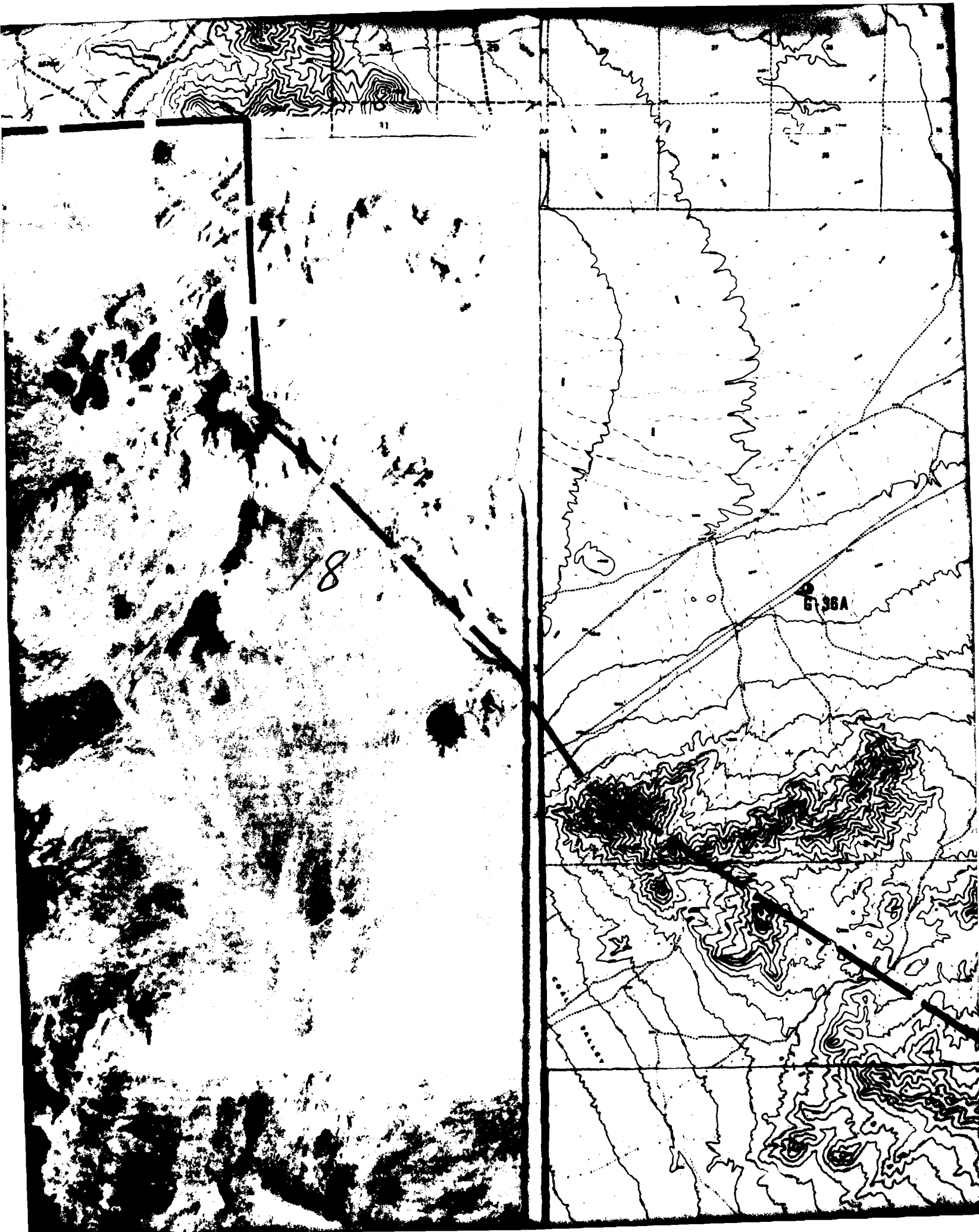


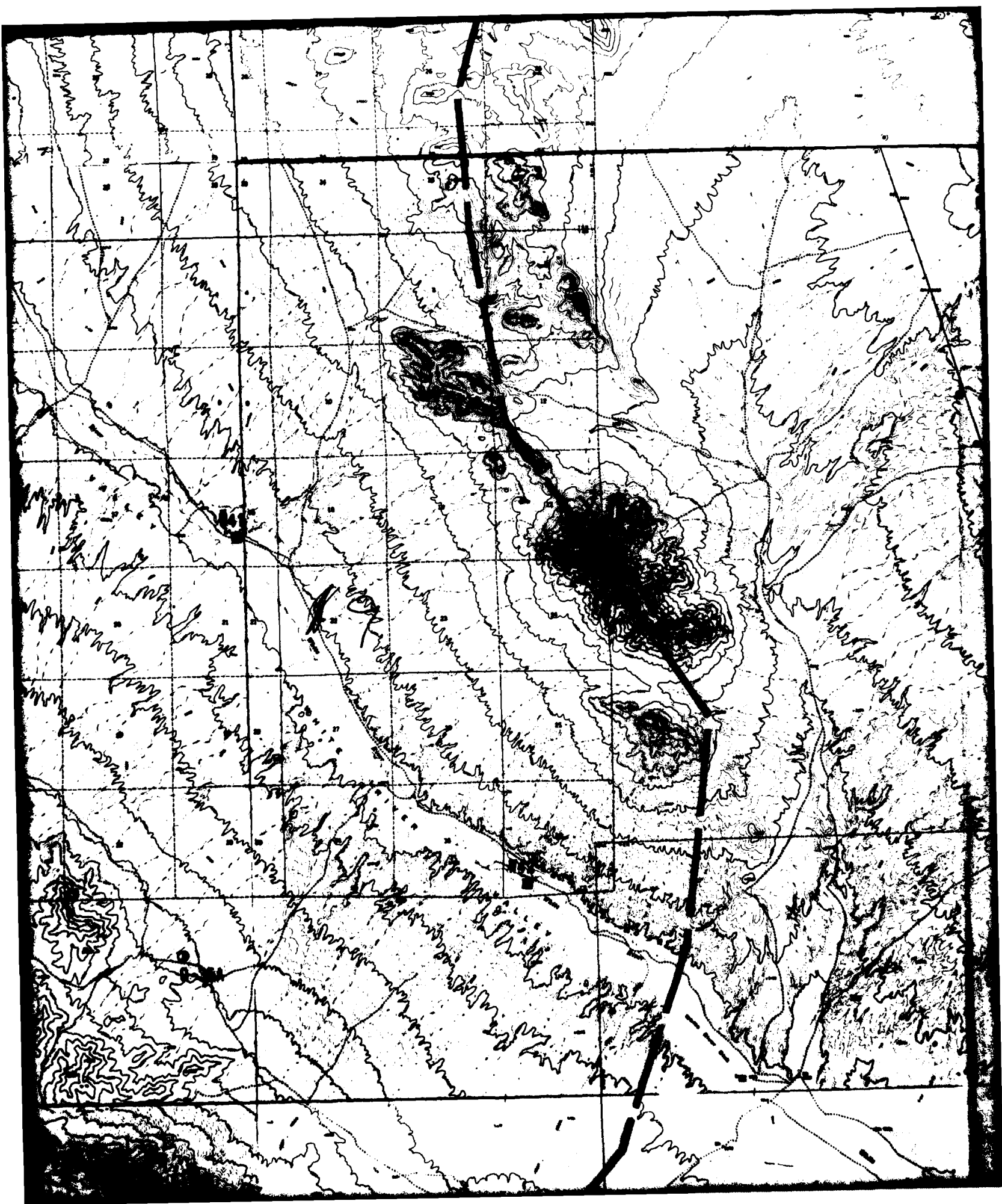




38°15'



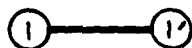




EXPLANATION

38°15'

- G-1A GEOLOGIC STATION
- W1 GROUND WATER LEVEL MEASUREMENT
- B-1 BORING
- C-1 CONE PENETROMETER TEST (CPT)
- △ CS-1 SURFACE SAMPLE AT CPT LOCATION
- T-1 TRENCH
- ▲ P-1 TEST PIT
- S-1 SEISMIC REFRACTION LINE
- R-1 ELECTRICAL RESISTIVITY LINE



ACTIVITY LINE



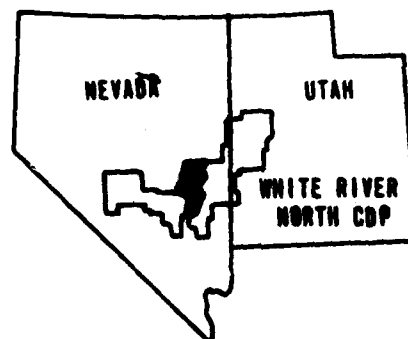
VERIFICATION SITE BOUNDARY



CANDIDATE DEPLOYMENT PARCEL (CDP) BOUNDARY

NOTE: Where multiple activities were performed at the same location, the correct location is designated by either (1) the boring symbol or (2) the CPT symbol, if no boring was drilled.

LOCATION MAP



SCALE 1:62,500



STATUTE MILES



NAUTICAL MILES



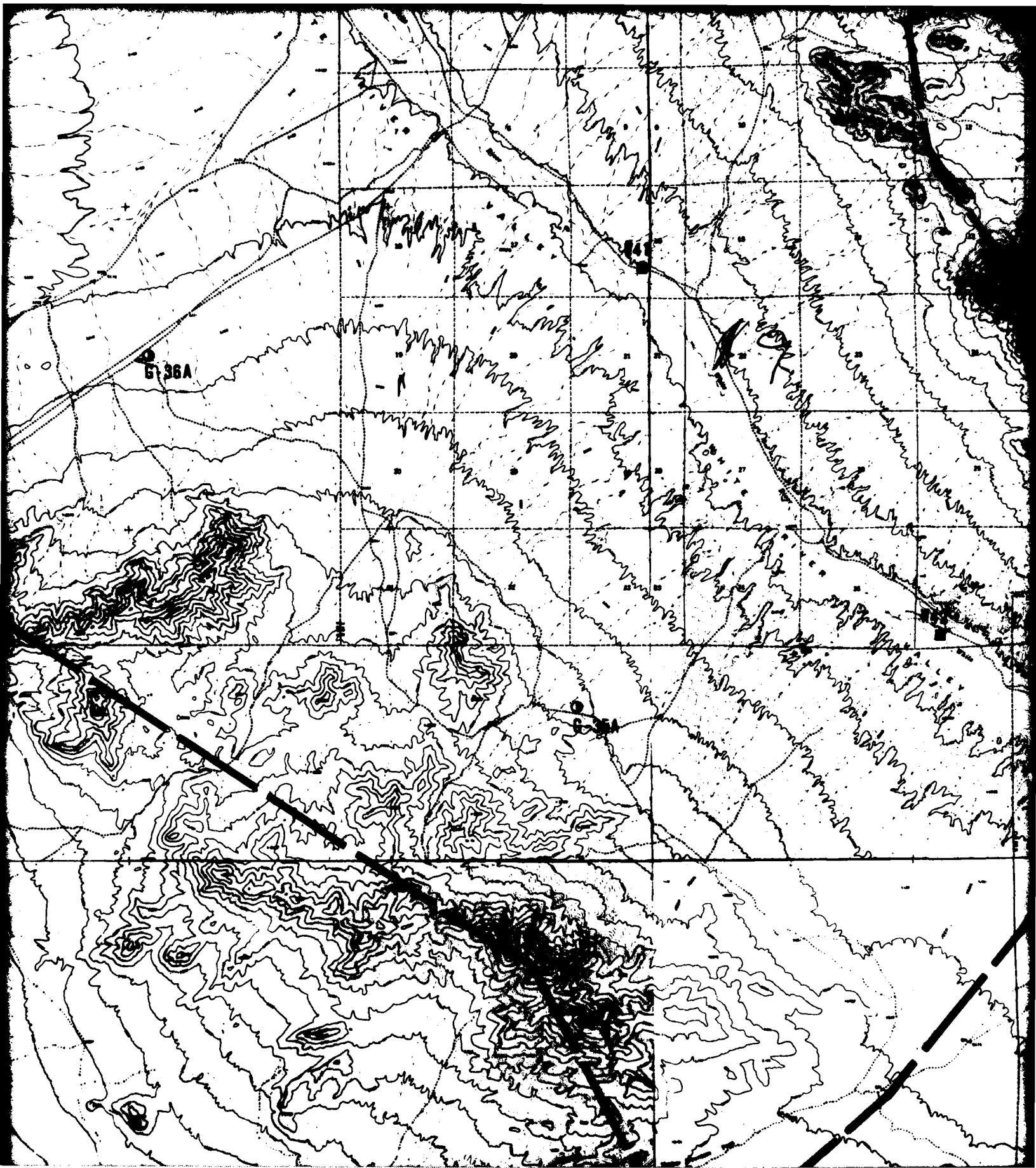
FEET



KILOMETERS





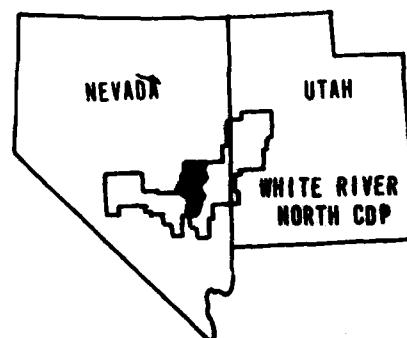




- T-1 TRENCH
- ▲ P-1 TEST PIT
- S-1 SEISMIC REFRACTION LINE
- R-1 ELECTRICAL RESISTIVITY LINE
- ① — ② ACTIVITY LINE
- VERIFICATION SITE BOUNDARY
- CANDIDATE DEPLOYMENT PARCEL (CDP) BOUNDARY

NOTE: Where multiple activities were performed at the same location, the correct location is designated by either (1) the boring symbol or (2) the CPT symbol, if no boring was drilled.

LOCATION MAP



SCALE 1:62,500



STATUTE MILES



NAUTICAL MILES



FEET



KILOMETERS

ACTIVITY LOCATION MAP WHITE RIVER NORTH CDP, NEVADA

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